

# ROADS AND STREETS

APRIL, 1948

HIGHWAYS BRIDGES AIRFIELDS HEAVY CONSTRUCTION

We have used Timken® Bits for a number of years and we are very much satisfied with them"

— says R. G. Watkins & Son, Inc.

R. G. Watkins & Son, Inc., Amesbury, Massachusetts, has enjoyed many years of successful operation as a general contractor in the New England area, hence is in a position to evaluate authoritatively the performance of construction equipment of all kinds—including rock bits. Nothing we might add to the statement quoted above, therefore, could make it any stronger.

The photographs reproduced here show rock drilling operations in connection with the construction of a new scenic highway being built by R. G. Watkins, Inc., for the State of New Hampshire, primarily for the attraction of tourists. On the rock removal part of the job the contractor is using 5 pneumatic hammers, 3 wagon-drills and 3 - 315 ft. compressors.

Are you paying more than you should for rock drilling? You are if you are not using Timken Rock Bits. It will pay you to investigate now. The Timken Roller Bearing Company, Canton 6, Ohio.



New York City 17  
Richmond 19

AL  
TIMKEN  
U.S. PAT. PEND.  
ROCK BITS



Heavy-duty lights that won't shake apart.  
Water can't get in and short them.  
Mounted anywhere on vehicle. Supplied  
with  $6\frac{1}{2}$ " red lenses lettered "STOP," or  
with plain red, amber or blue lenses for 6  
and 12 volt systems.

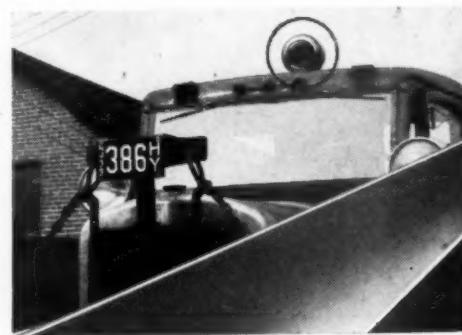
Flashing action in a warning light is seen and obeyed. Only this Keystone Flashing Light provides it two ways at once, both to front and rear. It does the work of two or more lights at the cost of one. It means safety for your men—the public—and your equipment.

Keystone Flashing Lights have been used successfully for many years by countless cities, counties, townships, park and bridge commissions, state highway departments, public utilities, etc., on all types of vehicles. Write us to send you a light for inspection.

Auto Gear & Parts Co., Inc., 16th St. and Hunting Park Ave., Philadelphia 40, Pa.

## KEYSTONE FLASHING LIGHT

*The "Lighthouse" of the Highway*





Old road went through narrow underpass (left center), then turned sharply up hill, past farmhouse. New underpass will accommodate 4 lanes, and highway will skirt river.

## Taking a Kink Out of the Lincoln Highway



Tons of rock and limestone were moved to make way for new underpass, built adjacent to old highway.



Double-barrelled underpass starts to take shape. Bethlehem structural steel, in spans of 118 ft and 54 ft, was erected without interrupting railroad traffic.



At another location on job, Bethlehem reinforcing bars are placed atop 34-ft-span reinforced-concrete bridge.



Dale W. Detwiler (left), partner in New Enterprise Stone and Lime Co., points out job detail to R. S. Over, construction superintendent.

As part of its road-modernization program, the Pennsylvania Department of Highways has relocated the Lincoln Highway (US 30), in the vicinity of Everett, Pa., thus eliminating a sharp curve and narrow underpass. Construction of the new 2- and 4-lane, 2-mile stretch of road, handled by New Enterprise Stone and Lime Co., New Enterprise, Pa., included building a long revetment, a reinforced concrete bridge, and a railroad underpass. Bridge reinforcing, structural steel, bar mats and road joints were supplied by Bethlehem.

**BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.**  
On the Pacific Coast Bethlehem products are sold by  
Bethlehem Pacific Coast Steel Corporation  
Export Distributor: Bethlehem Steel Export Corporation

### STEEL FOR HIGHWAYS

Road Joints • Reinforcing Bars • Bar Mats  
Guard Rail • Wire Rope and Strand • Spikes  
Timber Bridge Hardware • Structural Shapes  
Guard Rail Posts • Hollow Drill Steel  
Bolts and Nuts • Tie-Rods • Fabricated Steel



# ROADS AND STREETS

APRIL, 1948 • VOL. 91 • No. 4

With Roads and Streets Have Been Combined  
Good Roads Magazine And Engineering &  
Contracting

## Coming Articles

### Construction Methods

How a Nevada contractor moved 292,000 cu. yd. in 23 days, with details of outfit used

West Virginia's biggest road contract—mostly rock, but modern equipment moved 4,000 cu. yd. per day

### Soils Engineering

Report on ARBA conference in San Francisco

Beginning serial presentation of new book, "Soil Stabilization and Compaction," by H. K. Glidden

### Bridge Projects

Quick Work with Two Cranes—how a Michigan deck girder structure was erected in jig-time

California's War Surplus Bridges

### From Last Winter

Advance Snow Plowing Plan Paid Off at LaGuardia  
Spring Snow Fighting in the Western Passes

### Municipal

Face-Lifting Milwaukee's Main Drag . . . and other city street construction and repair articles

### Other Subjects

Improved Traffic Striping Machine . . . Maintenance of Stabilized Shoulders in Ohio . . . Tunnel Project Planned for Pittsburgh . . . Progress Report on the Chicago-Detroit Expressway . . . Numerous other articles of interest to county engineers, contractors, shop and equipment men

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A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations, and to the construction and maintenance of airports.

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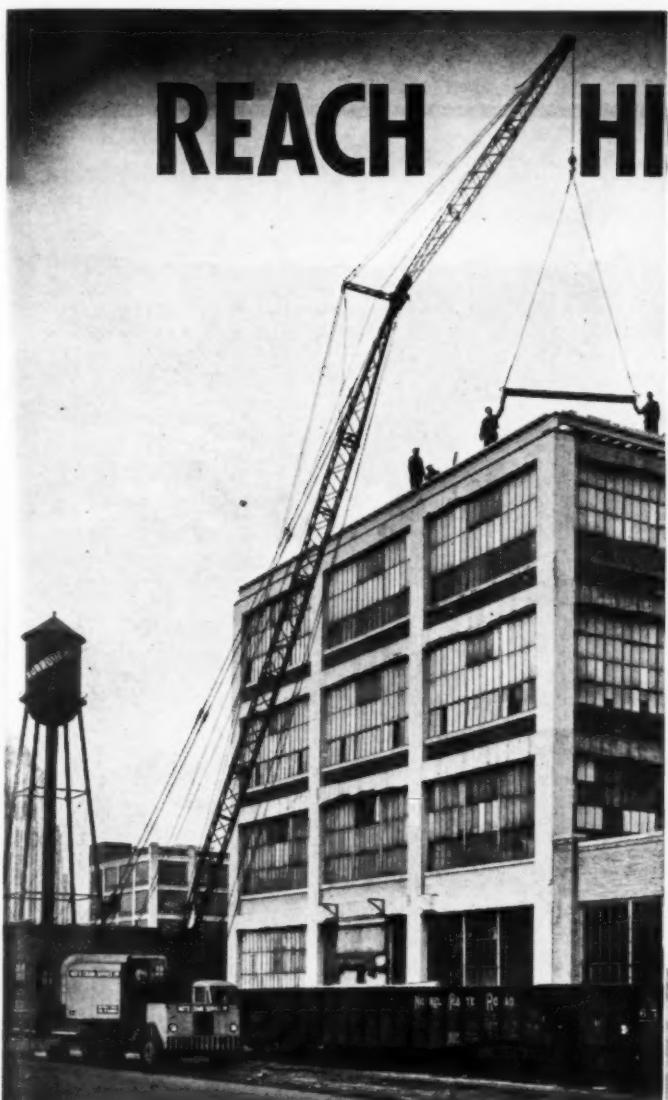
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# REACH HIGH...DIG DEEP



**T**HE turntables on these two machines are twins but there the resemblance ends. One contractor wanted a highly mobile crane that could handle up to 110 ft. of boom with ease and precision. The other demanded a dragline mounted on a 2-speed chain drive crawler that could literally float on top of the job while ladling out big yardages of mud and muck.

Both made their selection from the "Lorain-41 Series"—a complete line of shovels and cranes featuring one basic turntable design with a choice of crawler mounting or three types of Moto-Crane and Self-Propelled rubber-tire carriers. And both got the cream of the  $\frac{3}{4}$  yd. class for the "41" on any mounting with any type of boom is an outstanding performer. You can get complete details from your local Thew-Lorain distributor. Write or call him today.

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**thew Lorain 41 SERIES**  
CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

**P & H**

# Single Pass



*9 $\frac{1}{2}$  miles* OF SOIL CEMENT ROAD

*IN 20 days!*

In state after state, wherever P&H Single Pass Soil Stabilizers are on the job, new road-making economy like this results — excellent, all-weather surfaces are made more quickly.

This Iowa highway of over 9 miles was completed in only 20 working days. The road is 24 feet wide and was processed to a depth of 6 inches. Maximum production, even with a green crew, was 1,000 sq. yds. per hour. Daily average was over 6,300 sq. yds.

No foreign materials were brought in . . . the P&H Stabilizer utilized native in-place soils. The only auxiliary equipment required was one sheep's foot

roller and tractor, rubber tire roller, one motor grader and steel roller.

P&H Stabilizers enable you to perform all stabilizing operations in one pass with one machine and one operator. It makes it possible to meet specifications exactly and produce roads of predetermined load-carrying capacity. It shaves and pulverizes the in-place material, blends, maintains true sub-grade, applies the liquid, final mixes and spreads to a uniform depth — and does it rapidly. Full information on request.

# **Soil Stabilizers**

**CUT ROAD BUILDING COSTS**

## **FACTS ABOUT THE JOB**

**LOCATION OF PROJECT**—Highway 37, Monona County, Iowa — from Turin to Soldier.

**LENGTH OF PROJECT**—9.053 miles.

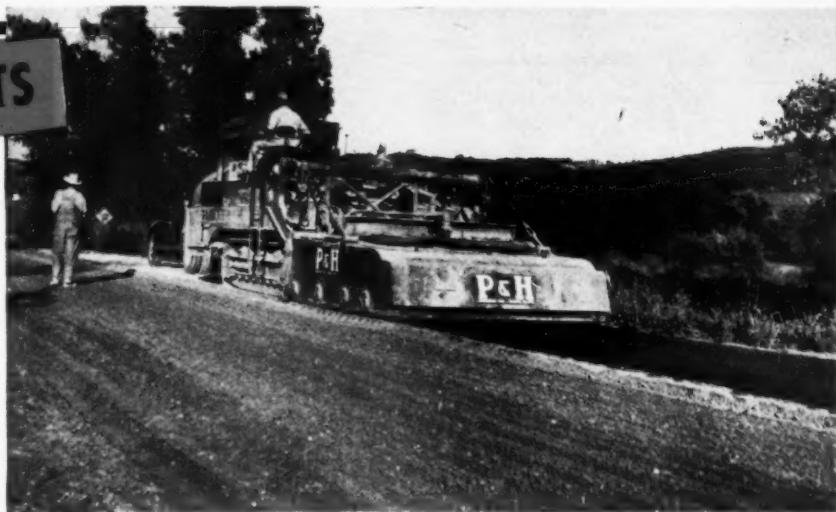
**WIDTH OF ROADWAY**—24 feet (3 lanes of 8 ft. each).

**DEPTH OF TREATMENT**—6 inches, compacted.

**TYPE OF SOIL**—Silt (Loess).

**STABILIZING AGENT**—Cement (10% by volume).

**RATE OF PRODUCTION**—Over 6,300 sq. yds. per working day average.

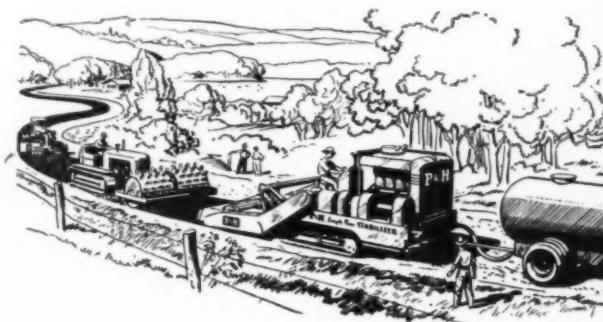


## **P&H Stabilizer Performs these 8 basic requirements in a Single Pass!**

On this Iowa project the P&H Stabilizer proved again its ability to fulfill these 8 basic requirements of soil stabilization with definitely predetermined results.

1. Control processing depth for accurate proportioning.
2. Pulverize the soil thoroughly.
3. Blend materials uniformly.
4. Create a true sub-grade.
5. Disperse the liquid through the entire volume in measured quantity.
6. Mix the coated material uniformly.
7. Lay the completely processed material in a fluffy, even depth, ready for compaction.
8. Do all these things in one pass — at a good rate of speed.

If you are engaged in the construction of secondary highways, streets, base courses, airport runways, etc., it will pay you to investigate the performance of the P&H Single Pass Soil Stabilizer under conditions similar to your own. Ask for the facts.



### **NEW SOUND MOTION PICTURE**

Just completed, a 22-minute full-color sound picture telling all about the P&H Single Pass Soil Stabilizer — with operating information, job scenes, etc. Write for information on free showing.

# **P&H**

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4496 West National Avenue  
Milwaukee 14, Wis.



## Iowa

"Caterpillar" D7 Tractor and No. 70 Scraper leveling ground for Muscatine athletic field. Owner Lee Osborne says: "If I can have two months more of good weather, this scraper won't owe me a thing. It's a fine scraper and it has a fine dealer service behind it. I wouldn't think of buying this type of equipment from anyone but 'Caterpillar'."

## Indiana

"Caterpillar" D7 Tractor and No. 70 Scraper grading road for subdivision. Lowell Engineering Company's Lyle W. Brown says: "This scraper makes loading easier—can load in 2nd gear. Swung low to ground for balance. Can get in close quarters. Large tires give good flotation in sandy soil. Allows good visibility of road and cutting edge."



## Arizona

"Caterpillar" D7 Tractor and No. 70 Scraper leveling farmland for cotton near Buckeye. Owner J. C. Higgins says: "The No. 70 is a dandy. Ease of loading is what I like best. We can fill the scraper without the pusher. This saves me money, as I can have the pusher tractor working on some other job."

# They all



## New York

"Caterpillar" D8 Tractor and No. 80 Scraper stripping overburden for gravel pit to supply sub-base for highway. Owner, Rochester Concrete Construction Co., Inc. Operator Leon Jackson says: "It's the easiest scraper to load I've ever used and I can dump in 6th gear."



## California

"Caterpillar" D8 Tractor and No. 80 Scraper loading and dumping shale rock on county road widening job.

For Monterey County Highway Department, Mr. H. Cozzens says: "We do a lot of changing from 'dozer' to scraper work and appreciate the ease of quick mounting. The No. 80 Scraper is the easiest and fastest loading, and operator says cable control is the smoothest he has ever used."



## Colorado

"Caterpillar" D8 Tractor and No. 80 Scraper building 25-foot fire-wall for refinery tank

yard in soft, sandy soil. Owner Fred DeBetz says: "I have used most makes of scrapers and this No. 80 'Caterpillar' is by far the best I have ever used."

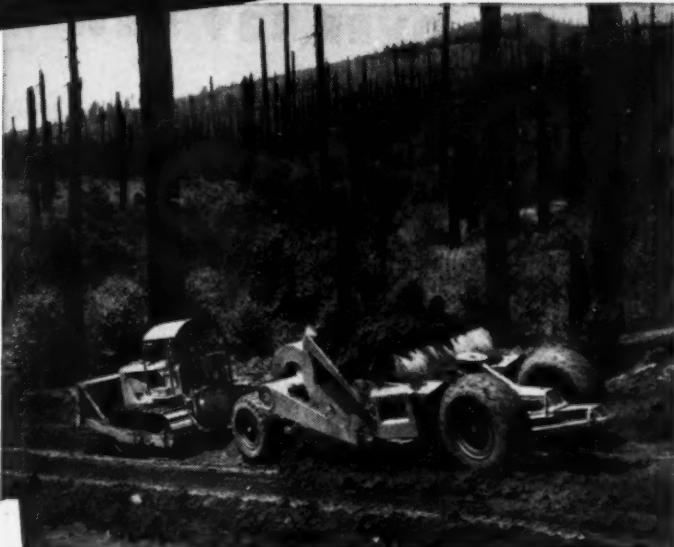
cheer for

## "CATERPILLAR" SCRAPERS

The success of "Caterpillar" products has always been based on outstanding performance in the field. As with Tractors and Engines, it is the fine performance of "Caterpillar" Scrapers that brings from owners and operators in all parts of the country such statements as are quoted here.

(The standard model No. 70 Scraper is priced at \$6050; the No. 80, \$8565—both F.O.B. Peoria, subject to change without notice.)

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS



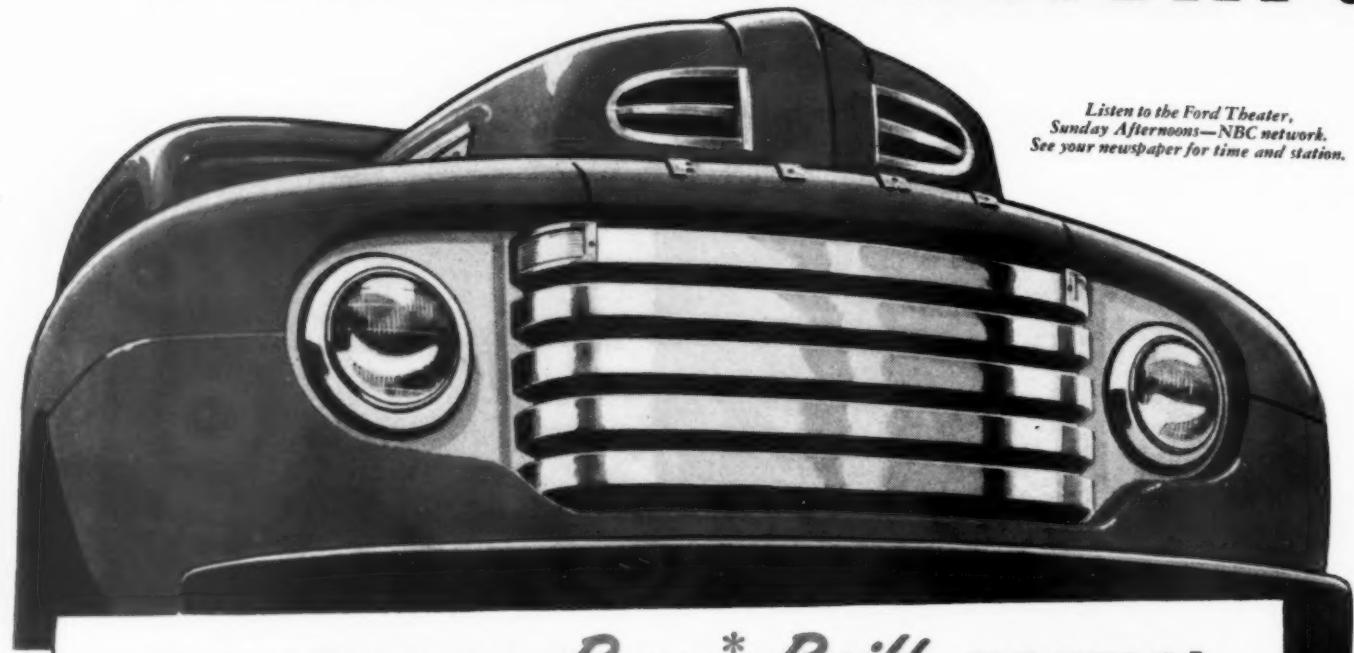
## Washington

"Caterpillar" D7 Tractor, No. 78 Bulldozer and No. 70 Scraper

building new road to open up new farmland. Messrs. A. N. Stanley, James Reilly and Charles L. Hall, Commissioners of Clark County, owner, write: "The county's past success with 'Caterpillar' Motor Graders prompted us to buy this new 'Caterpillar' Diesel Tractor and Scraper. We like them so well that we are now considering the purchase of another D7 Tractor and No. 70 Scraper."

**CATERPILLAR**  
REG. U. S. PAT. OFF.  
**DIESEL**  
ENGINES • TRACTORS  
MOTOR GRADERS  
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See your newspaper for time and station.*

## OVER 139 NEW *Bonus\* Built* MODELS!



F-1—4,700 lbs. GVW. 8' Panel, 6½' Pickup, 6½' Platform or Stake. 114" w.b. V-8 or Six.



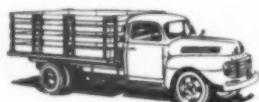
F-2—5,700 lbs. GVW. 7½' Platform or Stake, 8' Express. 122" w.b. V-8 or Six engine.



F-3—6,800 lbs. GVW. 7½' Platform or Stake, 8' Express. 122" w.b. V-8 or Six engine.



F-4—7,500 lbs. GVW. (singles), 10,000 lbs. (duals). 9' Platform or Stake. 134" w.b. V-8 or Six.



F-5—14,000 lbs. GVW. 9' & 12' Platforms or Stakes. 134" w.b. & 158" w.b. V-8 or Six engine.



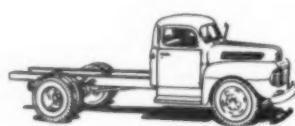
F-5 C.O.E.—14,000 lbs. GVW. 9' & 12' Platforms or Stakes. 134" w.b. & 158" w.b. V-8 or Six.



F-6—15,500 lbs. GVW. 9' & 12' Platforms or Stakes. 134" w.b. & 158" w.b. V-8 or Six engine.



F-6 C.O.E.—16,000 lbs. GVW. 9' & 12' Platforms or Stakes. 110"–134"–158" w.b. V-8 or Six.



F-7—19,000 lbs. GVW. 135"–159"–195" w.b. 9.00-20 maximum tires. 145 h.p. V-8 engine.



F-8—21,500 lbs. GVW. 135"–159"–195" w.b. 10.00-20 tires. 2-speed axle. 145 h.p. engine.

**NEW!** Three new truck engines . . . a new Six and two new V-8's developing up to 145 horsepower!

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*Bonus  
Built*

**TRUCKS**  
1948

**BUILT STRONGER TO LAST LONGER**

\*BONUS: "Something given in addition to what is usual or strictly due."—Webster

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Export: The Armco International Corporation.



## ARMCO DRAINAGE PRODUCTS

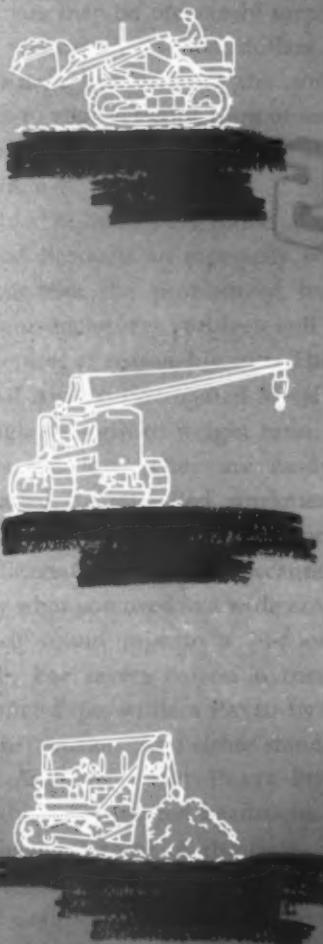


THREE-WHEEL  
TANDEM  
PORTABLE

THE  
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IRON WORKS & MFG. COMPANY  
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Increased-horsepower engines now give these heavy-duty Diesel crawlers new power and performance values. Smoother, cooler operation and greater lugging ability step up their work capacity to a new high!

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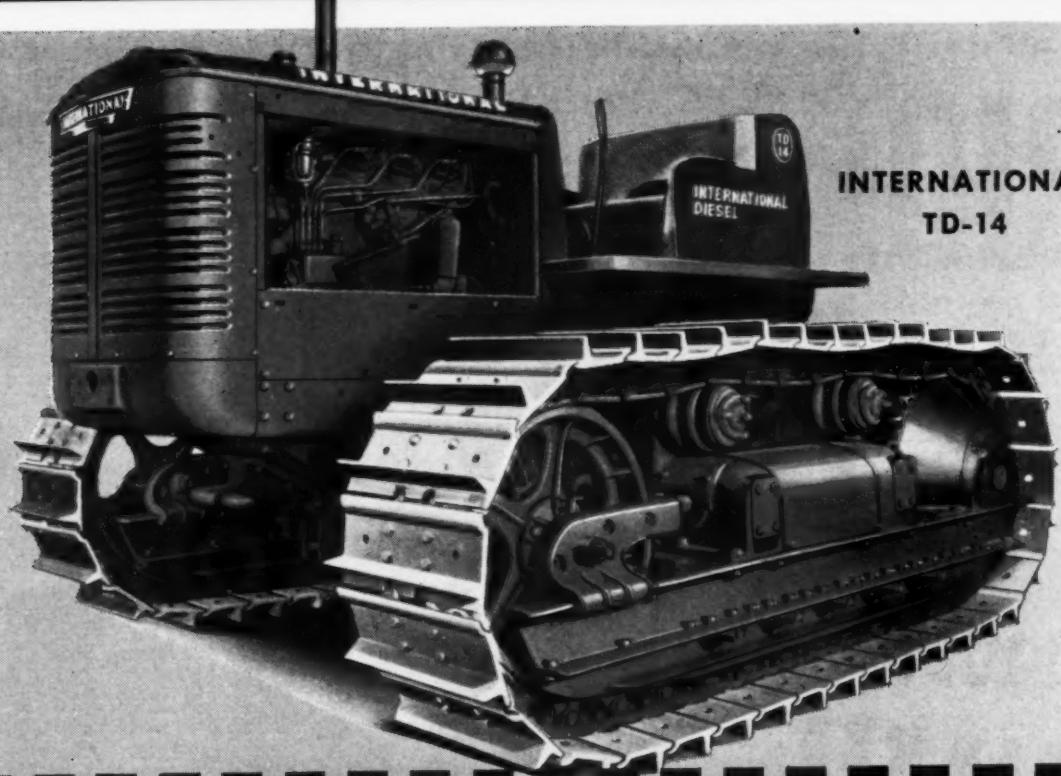
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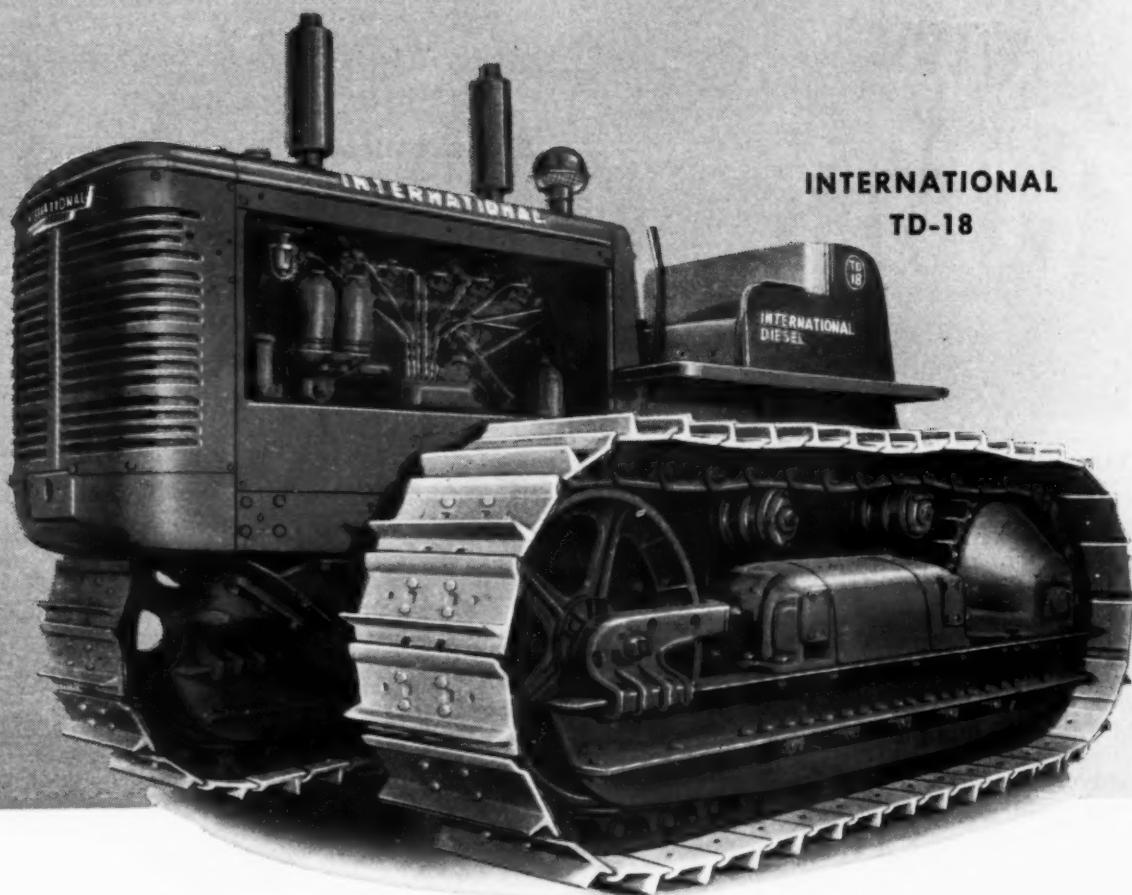
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**II**  
INTERNATIONAL HARVESTER

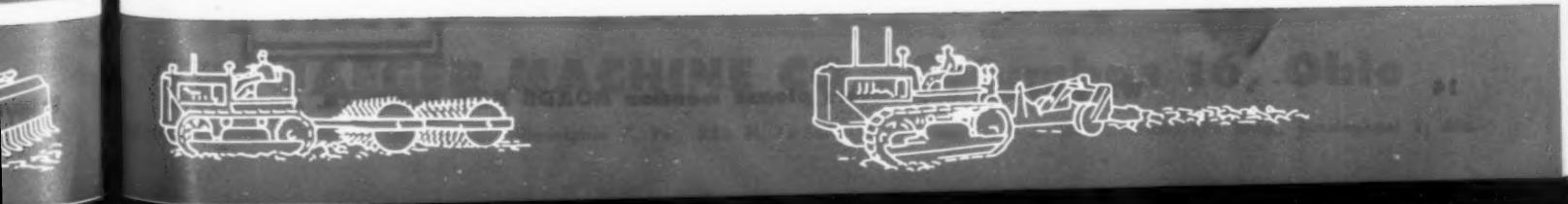


INTERNATIONAL  
TD-14



INTERNATIONAL  
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***Industrial Power***



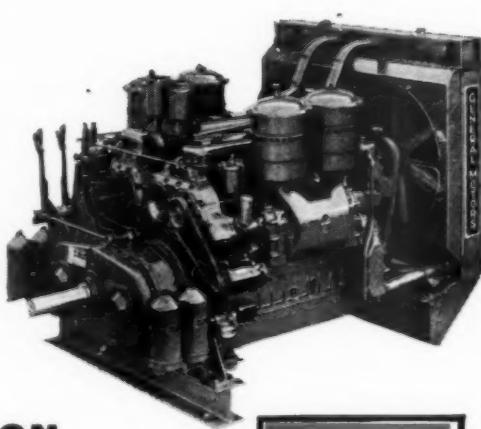


*Marion 111-M 3 1/2 cu. yard shovel strip mining for Yamulla Trucking and Excavating Company of Hazelton, Pennsylvania.*

TAKE the case of the Marion 111-M 3 1/2 cu. yard shovel. Here's equipment that calls for plenty of power fitted in a compact cab. This is where a General Motors "Twin" does a masterful job, because it makes available 330 husky, dependable horsepower.

Of course, the Yamulla Trucking and Excavating Company like their new shovel. The smooth electric swing, the snappy mechanical scoop, the economy of fuel and the dependability of its GM Diesels would please any shovel operator.

Discover what GM Diesel power can do for you as a prime mover or in fine contractor's equipment. Get the story from your local GM Diesel dealer or write direct to us.



### DETROIT DIESEL ENGINE DIVISION

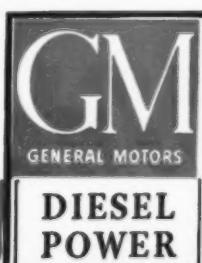
SINGLE ENGINES... Up to 200 H.P.

DETROIT 28, MICHIGAN

MULTIPLE UNITS... Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK



JAEGER announces the hoist with automotive transmission, hydraulic finger-tip control

# 2-SPEED HYDRO-HOIST

**2-SPEED FLEXIBILITY:** The shift of a lever gives you low-gear power or high-gear line speed—both in the same hoist.

**HYDRAULIC FINGER-TIP CONTROL:** The "feel" but not the weight of the load. Like \$25,000 cranes.

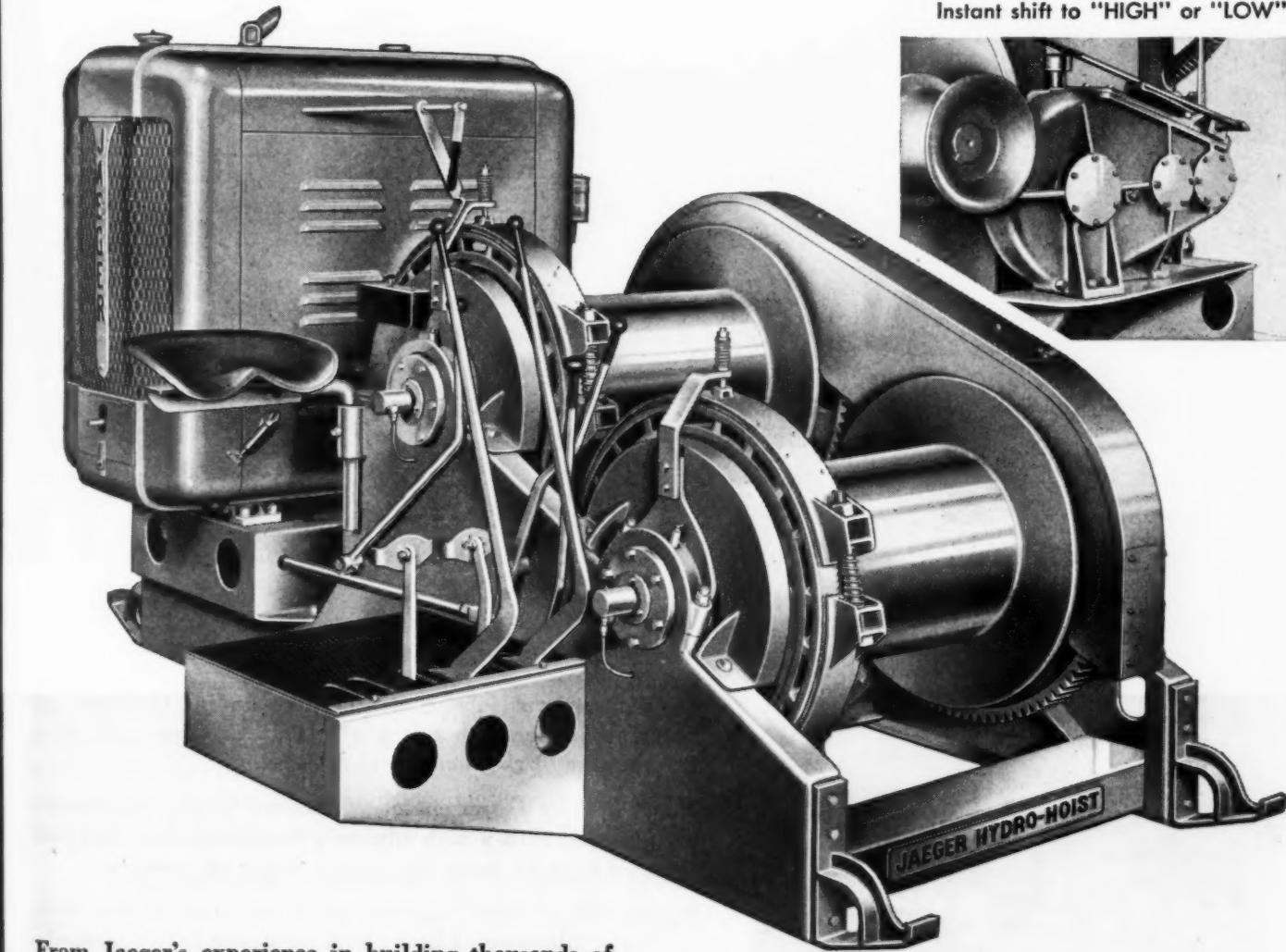
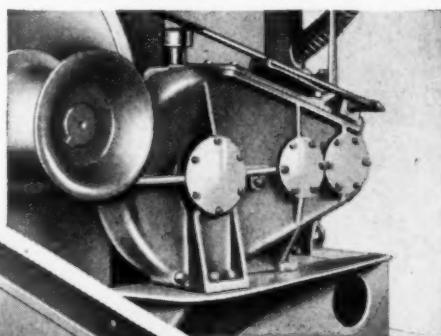
**ALL-STEEL, PRECISION FABRICATED:** No more broken side frames or drum flanges. Rigid, strong, yet lighter in weight.

**AUTOMOTIVE TRANSMISSION:** Use gas or electric power interchangeably at 1800 rpm. Quick change-over. Economical, efficient.

**25 TO 40 HP "UTILITY" HOISTS:** Single or double drum; gas or electric power.

**60 TO 100 HP "ERECTORS":** 1, 2 or 3 drums. Easy to add third drum to 2-drum hoist in the field. Gas, electric or diesel. Anti-friction bearings. Hydraulic-controlled boom swinger if desired.

Instant shift to "HIGH" or "LOW"



From Jaeger's experience in building thousands of hoists comes this revolutionary machine to speed your work, cut costs, often save buying a second hoist.

Merely shift the lever on the 2-speed transmission to select tremendous "low gear" line pull for the heaviest hoisting operation, or to select "high gear" line speed for the fast handling of lighter loads.

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In every feature of construction, Jaeger 2-Speed Hydro-Hoists are years ahead of the field. See your Jaeger distributor or send today for Catalog H-8.

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more air is THERE



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Companies that watch their costs are using Jaeger "AIR PLUS" Compressors in all sizes from 60 to 600 cfm—for faster production, for the economy of Jaeger's "Fuel Miser" speed control, for the simple, rugged Jaeger design that requires less attention on the job and minimum expense of upkeep.

On thousands of jobs, contractors are finding that they get faster production with a Jaeger "AIR PLUS" than with other compressors of the same rated capacity.

That's because Jaeger engineers designed to give you steadier air pressure, with a high efficiency compressor and fuel tank recessed to make room for a much larger air receiver.

Steady full pressure means top-speed operation of your drills — faster, full-powered blows with pavement breakers, spades and tampers — more production per tool and handler every hour they work.

Jaeger insures you against "down time", too. "AIR PLUS" Compressors are built to the same precision as their engines. Their parts, power plants and performance are individually tested in a \$250,000 laboratory. And leading distributors in 130 cities throughout the U. S. and Canada provide on-the-spot service wherever your jobs may be.

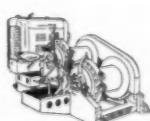
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1½" to 10" sizes



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3½ to 165 trailers



2-SPEED "HYDRO-HOISTS"  
25 to 100 h.p., 1 to 3 drums



BITUMINOUS PAVERS  
Latest type with quick  
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# for labor-saving mass production

## DIAGONAL SCREED FINISHING — the modern method behind mass-production pavers

Lays a smoother surface than is possible with any other finisher — and does it faster.

Finishes flush to higher form on pitched slab or super-elevated curves, saving 1 to 2 shovels.



The Type "X" Diagonal Screed Finisher, designed and patented by Jaeger, provides a basic improvement in finishing concrete pavements.

Where slab is pitched or super-elevated, you simply set the rear screed at whatever angle is needed to carry material uphill and compact it solidly against the higher form. No other finisher can do this.

Because the rear screed operates diagonally to the transverse front screed, it acts to average out irregularities left by the front screed, insuring a smoother surface and reducing hand work and equipment behind the finisher. Stiff mixes, worked at an angle by the final screed, can be finished faster without tearing. A wide range of screed speeds, *all independent of traction*, provides flexibility and finishing capacity to match the biggest dual drum pavers built today.

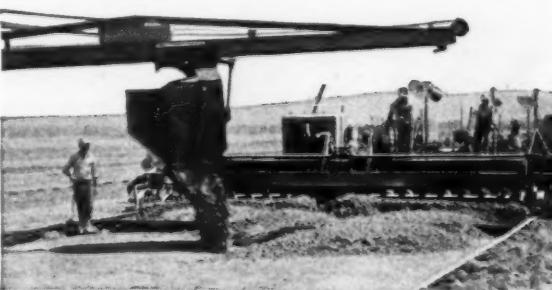


## Re-mixing, compacting spreader gives you a mass-production "team"

Important new improvements in Jaeger 1948 model Concrete Spreaders provide capacity and flexibility never before available to work with the Type "X" Diagonal Screed Finisher. One Spreader and one Finisher operator can spread, strike-off and smoothly finish the enormous output of two 34E dual drum pavers. Makes today's road builder an efficient mass-producer of square yards of pavement, at lower and more accurately pre-determined cost per yard.

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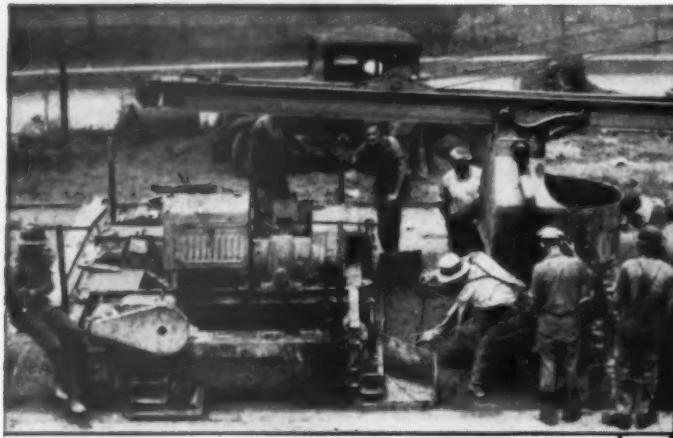
Wide, oscillating strike-off can be furnished if desired, for striking off concrete or for spreading and finishing bituminous material.



See your Jaeger distributor before bidding or laying out your jobs. Ask him or write us, for complete catalogs on Jaeger-engineered equipment.

**THE JAEGER MACHINE CO., Columbus 16, Ohio**

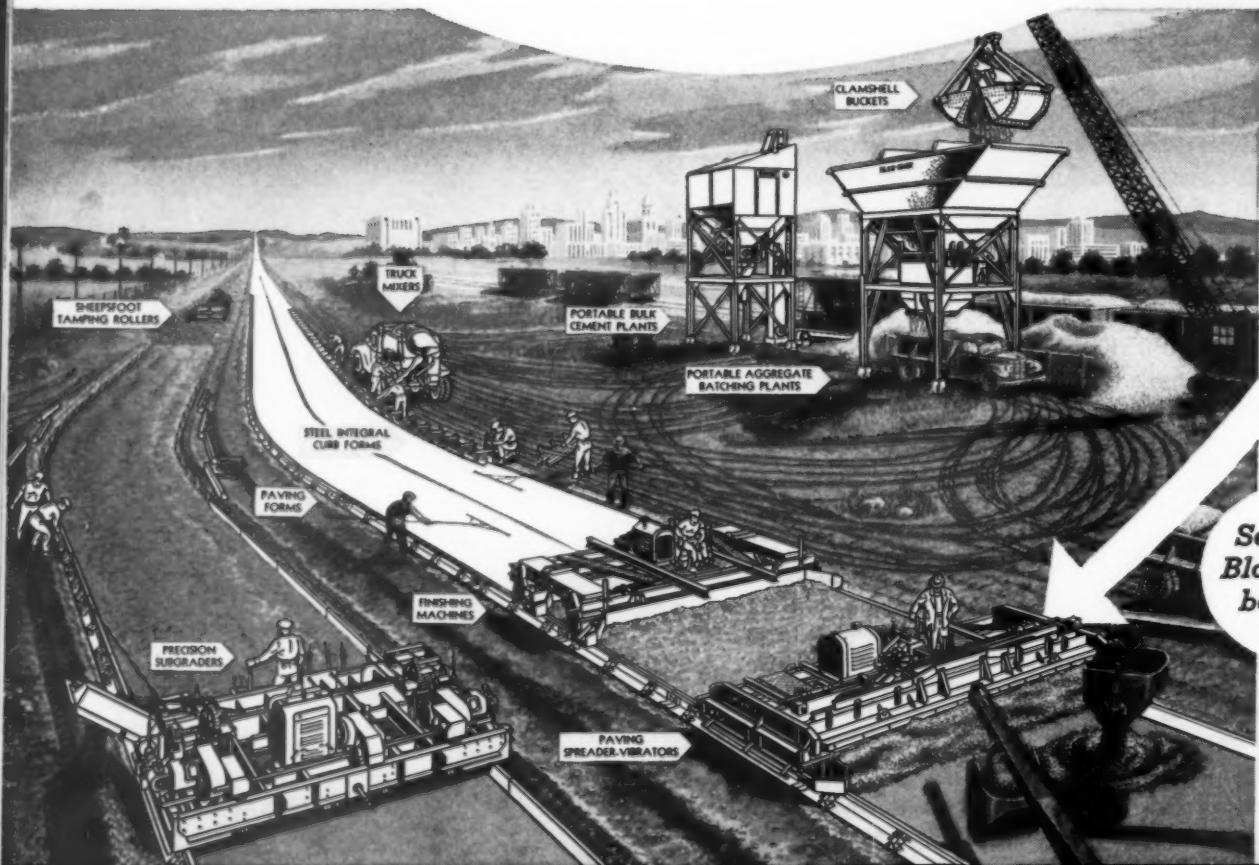
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...remember when  
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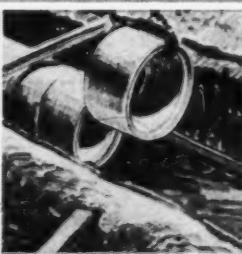
Every reinforced concrete paving job will be a better job when you use AMERICAN WELDED WIRE FABRIC.



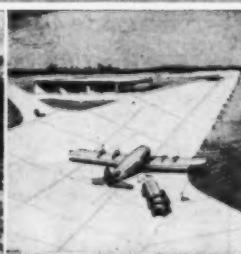
ROADS



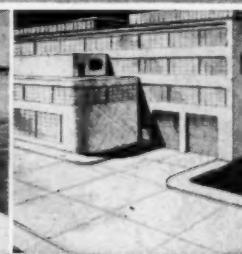
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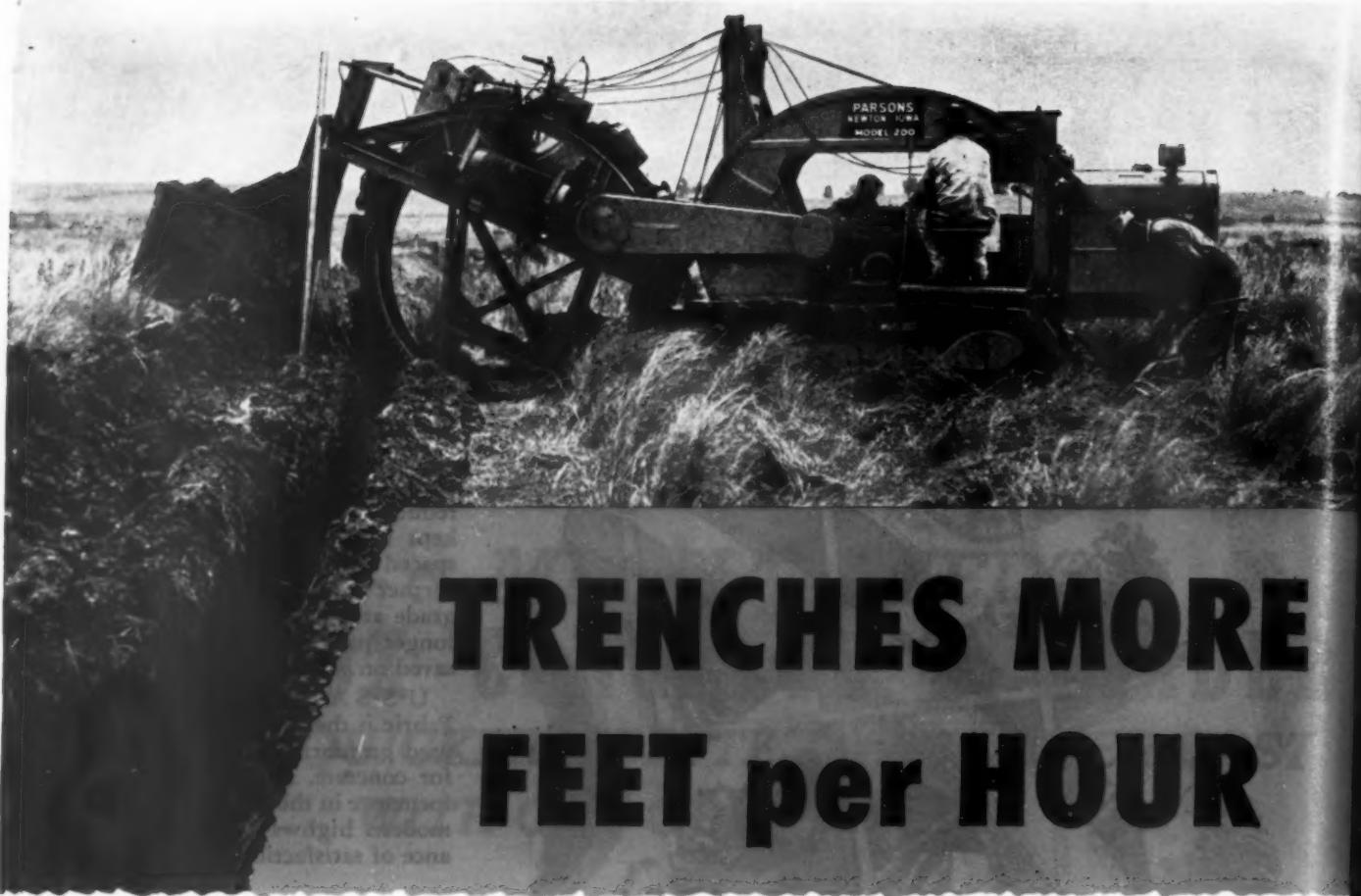
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## 200 wheel Trenchliner digs up to 20' per minute

Here's a high-production trencher that can dig as fast as 20' per minute on your farm, airport and highway drain-tile jobs. In oil fields, a mile of pipeline trench a day is not uncommon with this Parsons 200 wheel Trenchliner. Digs 15" to 26" wide, up to 5'-6" deep... produces clean, smooth-walled trenches that require no costly hand trimming.

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Specified drainage and irrigation ditch grades are easier to maintain, because wheel responds instantly to hoist... it's pivot-mounted, not tied down to dirt-catching, elevating slide tracks. Dirt, mud or grit can't affect its responsiveness. Wheel

hoist alone controls digging depth. Three-point hoist cables, worm gearing in wheel hoist case, and sensitive disc clutches give you accurate grade control adjustment to fraction of an inch.

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Heavy-duty wheel is supported at 4 points... is held firmly at bottom where digging pressure is greatest. Rugged arched wheel-frame rigidly supports both digging wheel and conveyor... keeps wheel precision-aligned for accurate grading. Main operating gears are fully enclosed... run in continuous oil baths... minimize maintenance, give you longer, trouble-free service.

Your Parsons distributor can show you many more production-boosting features about this 200 wheel Trenchliner. It's the fastest-digging of all 4 Trenchliner models built by Parsons. Get complete facts and figures from your distributor TODAY.



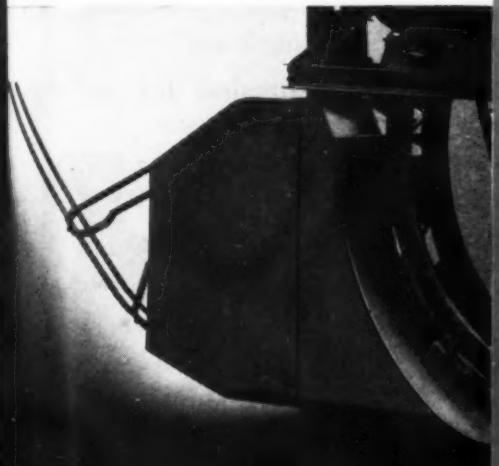
# PARSONS Trenchliners\*

\*Trademark Reg. U. S. Pat. Off. C7862



## Lays Tile 20% Faster

Parsons tile chute, optional on the 200 Trenchliner, can increase output as much as 20%. It slides tiles to bottom of chute . . . eliminates much heavy tile lifting . . . reduces muscular effort. Efficiently installs tile even in caving ground. This labor-saver, plus Trenchliner's accurately-graded trench, means more drainage installed per shift.



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2  
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## 16-S DANDIE\* folds batch 80 times per minute

Re-mixing drum folds batch 80 times during average 1-minute mixing cycle . . . thoroughly cement-coats every particle. Discharges full batch in 2½ revolutions. Side or end discharge. Can also be equipped with special, 90"-wide open end skip for loading from batch trucks . . . speeds production on many jobs. Other DANDIE sizes: 3½-S, 6-S and 11-S.

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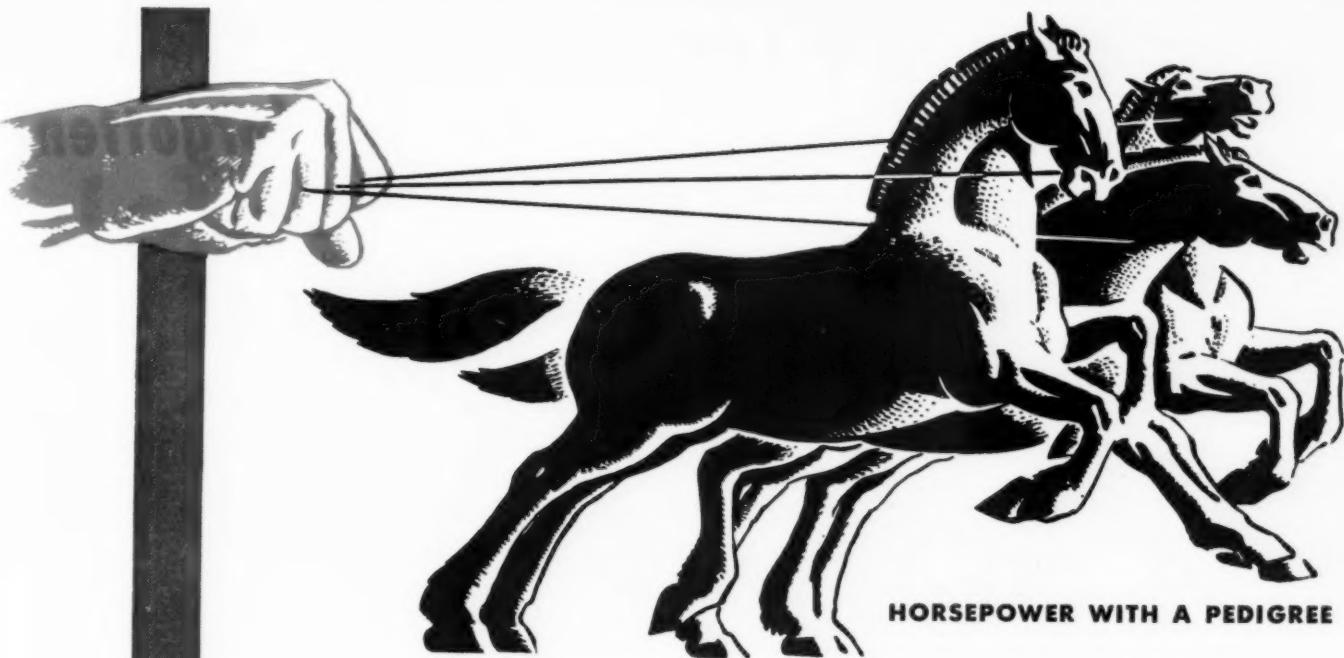
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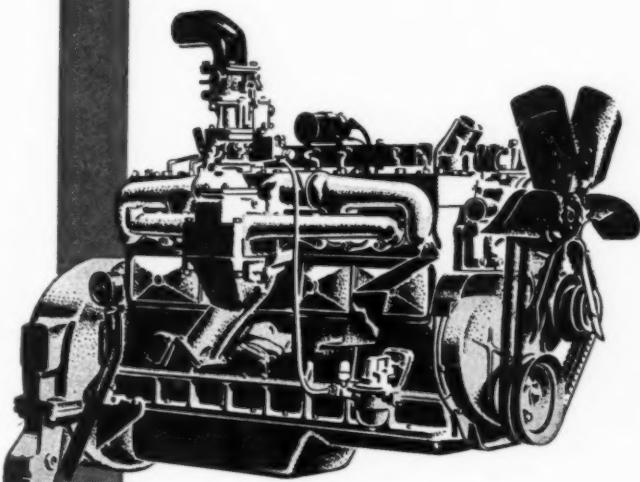
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## WHAT ABOUT NEXT WINTER?

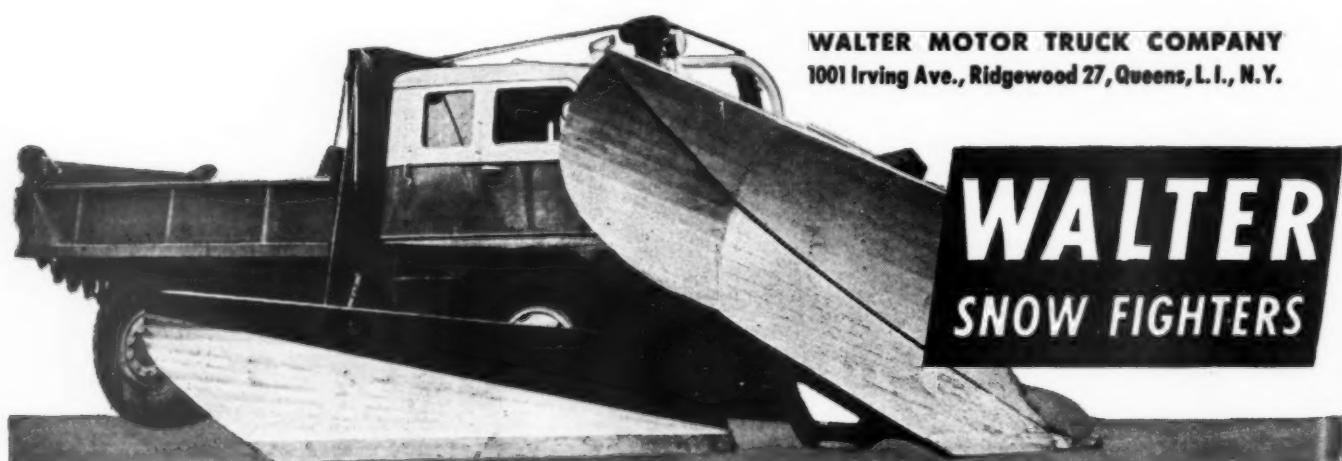
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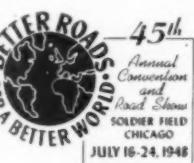
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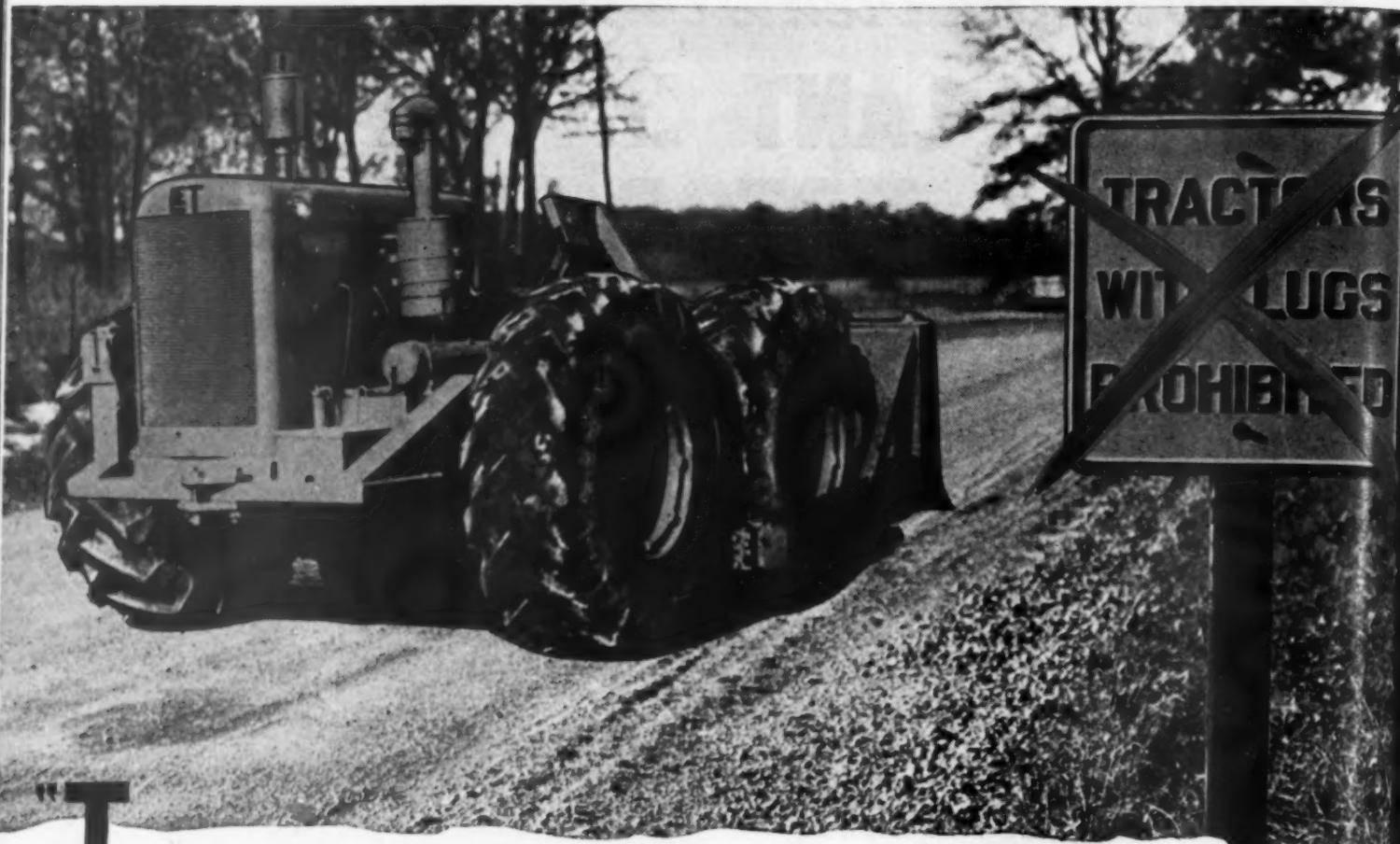


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## ½ Mile is only 2 minutes away

The Tournadozer's ability to make self-powered moves at 15 m.p.h. saves you time and money. You can drive a mile in 4 minutes . . . a half-mile in 2 minutes! You get there faster . . . complete the job more quickly . . . return in less time.

## Dozes 30% Faster

Tournadozer is faster on the job, too. With four speeds forward and reverse up to 15 m.p.h., you can doze a full load 30% faster . . . back up for next pass three times faster . . . complete your dozing cycle in 1/3 the time it takes a slow-moving crawler. With constant-mesh, constant-power transmission and instantaneous speed selection, Tournadozer can travel 200 feet in the 10 seconds a track-type dozer wastes shifting gears.

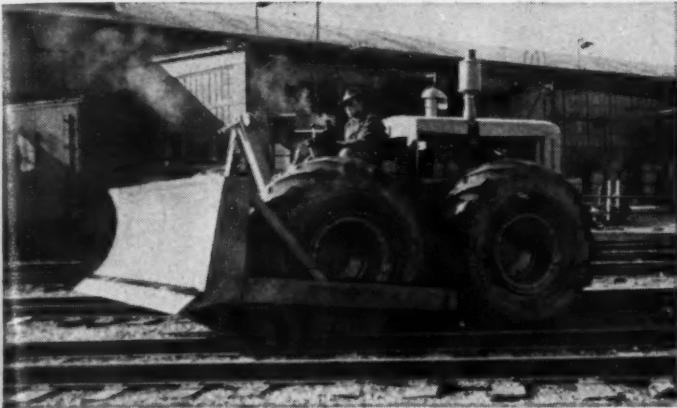
## Extra maneuverability and power

In addition, its 180 h.p. Diesel and 21:00 x 25 ground-gripping tires give you all the traction, dozing and pushing power you need for your all-around dozer work . . . plus twice the speed and maneuverability of a cumbersome, limited-travel crawler.



See your Le Tourneau Distributor  
NOW for complete information

# can go anywhere!



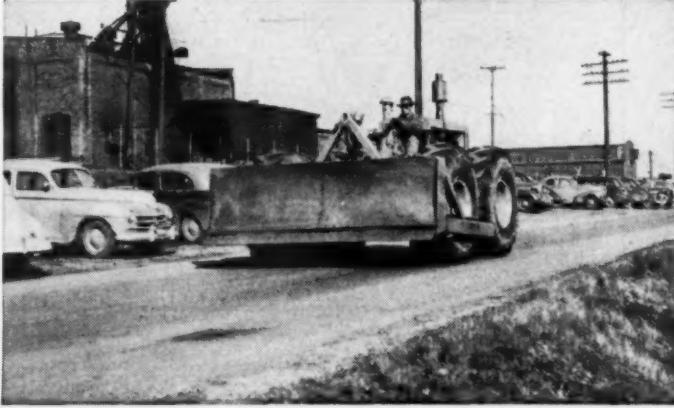
**Across rails** — Tournadozer is ideal for use along railroad right-of-way . . . it can cross and recross tracks at will, swiftly . . . without damage to rails or ties.



**City streets** — Tournadozer rolls smoothly along highways or streets . . . accurate controls give easy steering . . . multiple disc air brakes give quick, safe stops.



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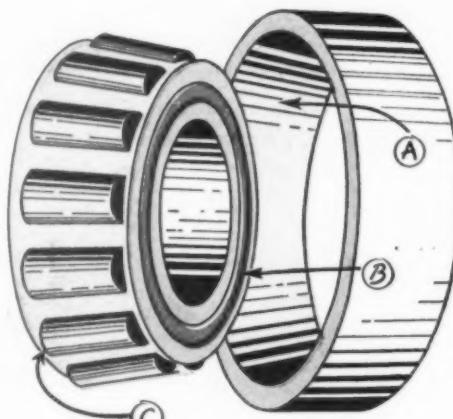
**LETOURNEAU**  **TOURNADOZERS**

PEORIA, ILLINOIS

# STANDARD ENGINEER'S CASE FILE



## CASE 1025--PROVIDING CONSTANT LUBRICATION IN WHEEL BEARINGS.

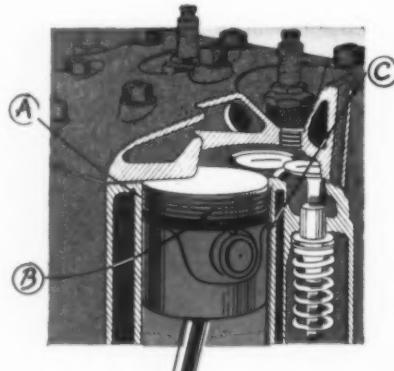


AUTOMOTIVE ROLLER WHEEL BEARING

Wheel bearings in trucks hauling heavy loads in desert heat, winter cold and rain, were in perfect condition long after usual servicing periods when the bearings were lubricated with RPM Wheel Bearing Grease. Recommended for all sizes and types of wheel bearings. Apply to bearing assemblies by hand or with mechanical lubricators.

- A. Maintains tough, resilient film on bearing surfaces - protects during constant pounding of road shocks and under overload pressures.
  - B. Feeds slowly to bearing parts ... resists extreme temperatures - will not melt and run from hubs onto brakes.
  - C. Stays in smallest bearing clearances.
- RPM Wheel Bearing Grease provides good lubrication in the presence of water.

## CASE 1017--REDUCING OVER-HAULS IN GASOLINE ENGINES.



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When gasoline engines were lubricated with compounded RPM Motor Oil, pistons, cylinders, valve stems and other oil-contacted parts remained clear of carbon, gum and lacquer. Wear was minimized and rusting was not a problem. Recommended for gasoline and butane engines. Seven grades: SAE 10/10W to SAE 70.

- A. Contains detergent which loosens and removes carbonaceous matter, keeps it dispersed in the oil so it is removed with drainings. Assures free-working rings, valves and other parts.
  - B. Sticks to hot spots - reduces usual wear on upper cylinders and pistons.
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- Other compounds in RPM Motor Oil resist oxidation, prevent corrosion of bearings, and stop foaming.

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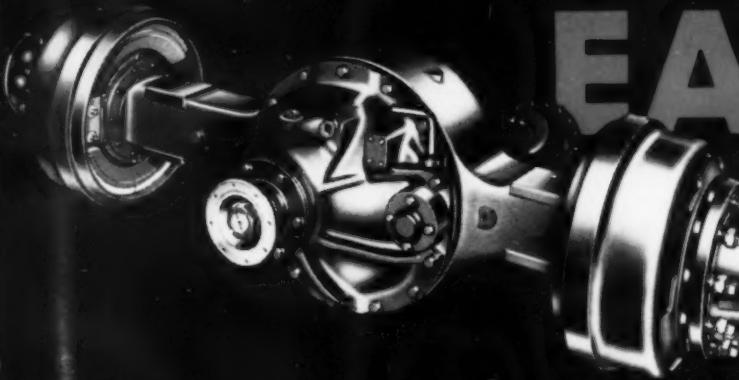


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The instant the gears in the Eaton 2-Speed Truck Axle turn over—even a single revolution—oil is started on its way to all moving parts. Planetary gears operate in a bath of oil. There is no operation without lubrication. The flow of lubricant is governed to meet the demands of various operating speeds. This assurance of abundant lubrication at slow speeds as well as high, reduces friction and wear on moving parts, and adds materially to axle life and freedom from repairs. Outstanding performance records are proof of Eaton quality and design. See your truck dealer for complete information.



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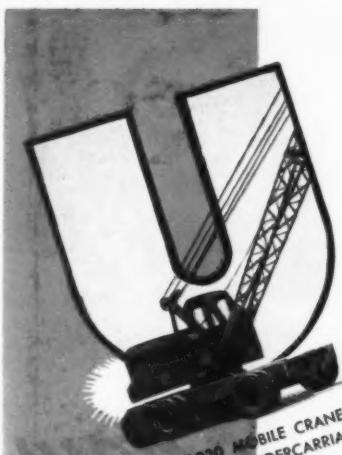
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**Chicago 10, Illinois**



UNIT 1020 MOBILE CRANE  
WITH 3 AXLE UNDERCARRIAGE  
10 TON CAPACITY



UNIT 1020 MOBILE CRANE  
WITH 2 AXLE UNDERCARRIAGE  
10 TON CAPACITY

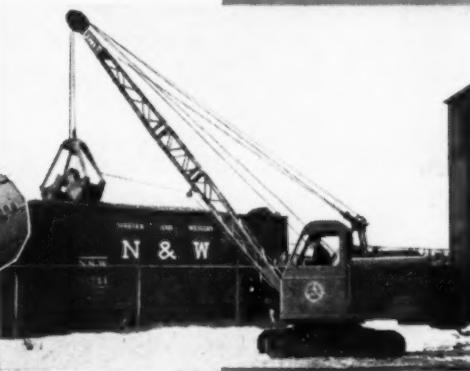


UNIT 357 MOBILE CRANE  
WITH 2 AXLE UNDERCARRIAGE  
5 TON CAPACITY



UNIT 1020 TRUCK CRANE  
MOUNTED ON 3 AXLE TRUCK  
10 TON CAPACITY

## production parade



UNIT 514 . . . ½ YD.  
CLAMSHELL

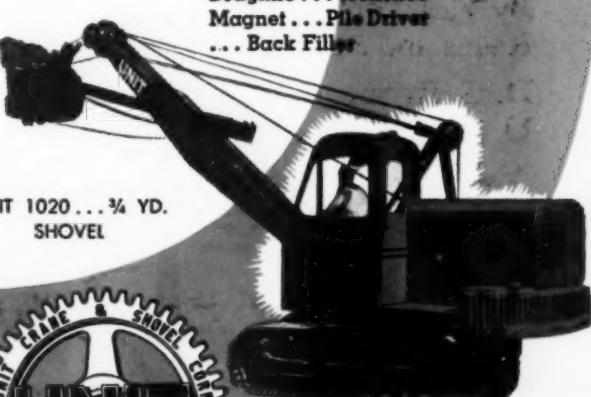


UNIT 1020 . . . ¾ YD.  
TRENCHOE

CONTACT  
FACTORY  
DIRECT  
FOR PRICE  
AND DELIVERY  
*or See Your Dealer*

*Full-Vision Cab .. ENABLES  
OPERATOR TO SEE IN ALL DIRECTIONS  
Convertible TO ALL  
ATTACHMENTS*

Shovel . . . Clamshell  
Dragline . . . Trenchhoe  
Magnet . . . Pile Driver  
... Back Filler



UNIT 1020 . . . ¾ YD.  
SHOVEL



MILWAUKEE 14,  
WISCONSIN, U.S.A.

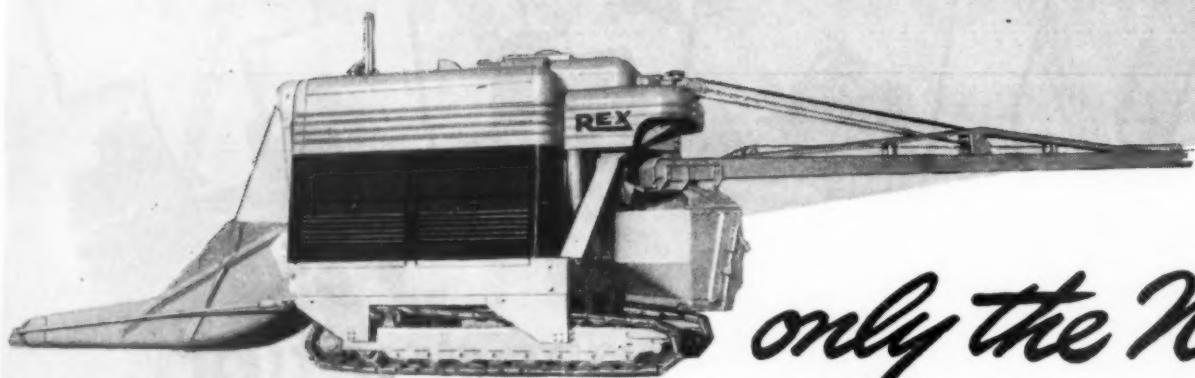
UNIT CRANE & SHOVEL CORP.

Address: 6407 W. Burnham St., Milwaukee 14, Wis.

A 5005-1PCU-R3

When writing advertisers please mention ROADS AND STREETS, April, 1948

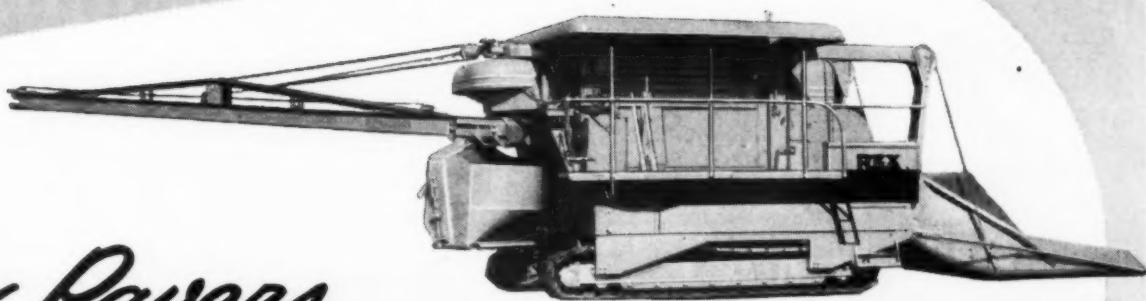
REX 34E SINGLE DRUM PAVER . . . ENGINE SIDE



*only the New*



REX 34E DOUBLE DRUM PAVER . . . OPERATOR'S SIDE



*Rex Pavers*

## give you HYDROCYCLE CONTROL

**REX HYDROCYCLE CONTROL** is a profit advantage you can't afford to miss. It gives you a faster over-all batch cycle for most yardage placed on the sub-grade. It cuts down operator fatigue . . . enables him to keep the paver going at top speed all day long. It's foolproof . . . eliminates the human element. It assures exact timing of batch cycle and mixing time . . . eliminates those costly wasted seconds that add up to so much lost yardage and lost profit.

**REX HYDROCYCLE CONTROL** combines the batchmeter and automatic cycle operation in one unit. All the operator has to do is set the batchmeter, give the levers a gentle palm push and Hydrocycle takes over . . . operates the charging,

batch transfer, discharging and water control. The operator never has to leave his comfortable seat. And at any time, the operator can cut into the cycle and take over operation by hand.

**REX HYDROCYCLE CONTROL** eliminates many drives, gear cases, rods, levers, bell cranks, etc. All control units can be placed right in front of the operator. The whole paver is more accessible for easiest maintenance.

WHY NOT have your Rex Distributor show you how Hydrocycle and the many other new advantages of the new Rex Pavers add up to greater yardage production . . . most profit for you. Or if you prefer, write us direct. Chain Belt Company, 1685 West Bruce Street, Milwaukee 4, Wis.

CONSTRUCTION MACHINERY



**BUCYRUS  
ERIE**

The smoothly coordinated action of Bucyrus-Erie shovels makes digging a rhythmic dig-swing-dump routine that quickly piles up big output. Behind this precision blending of operating functions is responsive, full-feel control that practically "puts the load in the operator's hand."

Whether he is swinging, crowding, hoisting, or propelling . . . whether he is just starting the shift or finishing up . . . the operator gets exactly the power response he wants. The big cool-running clutches are self-adjusting for temperature variations, respond to lever action with a softness that eliminates jerks. The large brakes have high holding power, yet pedal pressures are low. Operating levers are long enough for plenty of feel, short enough

for easy operation; a given pressure always effects the same response. Levers are conveniently arranged, too, so that the operator finds them all within easy reach.

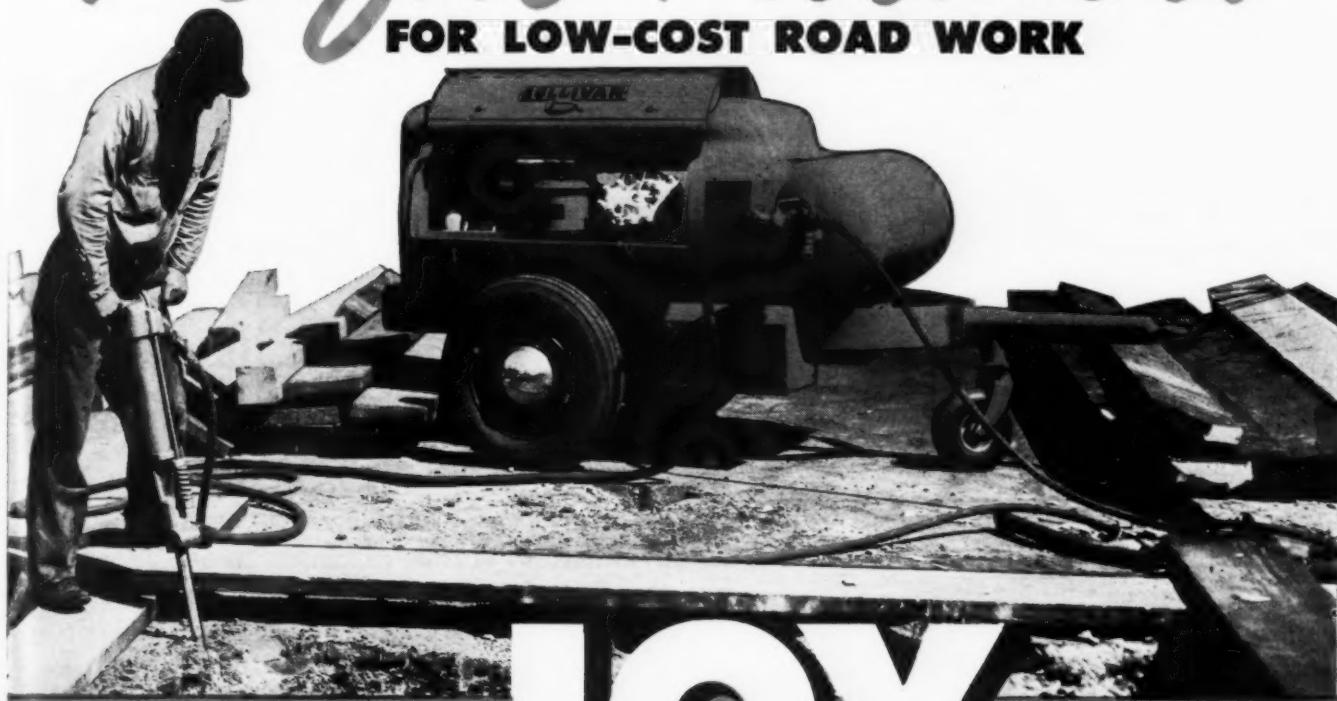
These are a few of the reasons why operators of Bucyrus-Erie  $\frac{3}{8}$ - to  $2\frac{1}{2}$ -cu. yd. excavators can maintain a high-speed clip all through the shift, regardless of front-end type. See your Bucyrus-Erie distributor for more details about the control that gives these machines a head start in any kind of digging. And don't fail to ask about their easy convertibility for operation as shovel, dragline, crane or clamshell.

102E47

**BUCYRUS-ERIE COMPANY**  
**SOUTH MILWAUKEE, WISCONSIN**

# Perfect Partners

FOR LOW-COST ROAD WORK



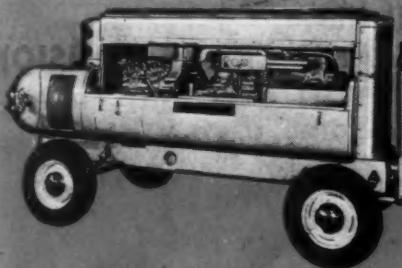
# JOY

## SERIES 80 AIR COMPRESSORS

from 68 to 630 c. f. m.

Two stage, air cooled compressed air plants—gasoline or diesel driven—with size and weight kept to a minimum to make them really portable, yet delivering air more efficiently than ever before.

Econo-Miser Load Control regulates air supply to meet the demand of the job.



Consult a  
Joy Engineer  
or write for  
bulletins



## JOY SILVER STREAK

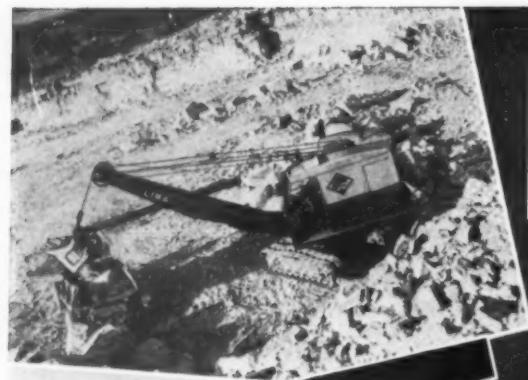
### Cadmium Plated Rock Drills

Cadmium plating not only protects your Sullivan drills from rusting, but, the lubricating properties of cadmium prevents scoring should lubrication temporarily fail.



SULLIVAN DIVISION  
**JOY MANUFACTURING CO.**

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.



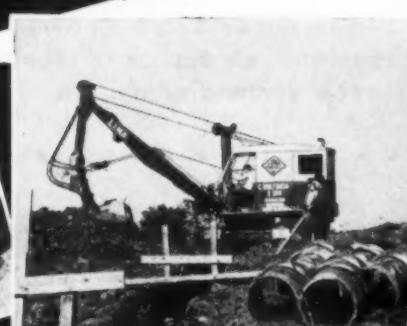
# LIMA Paymaster. 6 Machines all in One—

3/4 Yd.



The LIMA PAYMASTER is designed and built as a multiple purpose machine. It gives its owner the advantage of six (6) machines in one. Realizing the fact that most contractors bid various types of work, LIMA has gone to great lengths to give its users a machine that will work equally well as a shovel, crane, clamshell, dragline, pile driver or pull-shovel. Ease of convertibility is one of the many LIMA features that will enable you to handle more work with greater profit. Get the facts today on LIMA all-purpose machines. Write for bulletins.

**LIMA SHOVEL AND CRANE DIVISION  
LIMA-HAMILTON CORPORATION  
LIMA, OHIO, U.S.A.**



**LIMA**

**Capacities . . .**

**SHOVELS**  
3/4 YARD TO 5 1/2 YARDS

**SHOVELS . . .  
CRANES . . .  
DRAGLINES**

**CRANES**  
13 TONS TO 100 TONS

**DRAGLINES**  
VARIABLE



IT'S the fast action in handling the batch before, between and after mixing time that means high paver production.

Look over the MultiFoote Duo Mix! The skip is wide — you don't have to fit the truck into it! Skip action is fast. The material is in the first drum in a hurry. The transfer is of the rotary type — a quarter-turn and the material starts into the second drum — fast action here, too. It takes only a quarter-turn to open the discharge and the batch is in the bucket. Everything from controls to dumping the bucket is designed to clip seconds from the mixing cycle. It's a record maker.

See the Duo Mix (Double Drum) MultiFoote 34-E Paver. Talk to owners. You'll find its dependability, simplicity and speed will mean increased profits on your contracts.

**THE FOOTE COMPANY, INC.**  
Nunda, New York  
1936 State Street

Also see page 126



Annual Convention and Road Show  
SOLDIER FIELD CHICAGO  
JULY 16-24, 1948



• Black Top Jobs? Find out about the Adnun. It's the only Black Top Paver that lays stone, cinders, soil cement, gravel or other base materials!

# MULTIFOOTE

## CONCRETE PAVERS

BLACK TOP PAVERS • FOOTE KINETIC MIXERS

# Buckeye

The Outstanding **3/4 Yard Shovel**

**Now  
Better  
Than  
Ever\***

Available  
for spring shipment

**CHECK THESE NEW FEATURES**

- ✓ 2-piece swing clutch band—velvet smooth operation; easier replacement.
- ✓ Heavier revolving frame; more massive conical roller assembly; hardened steel roller path.
- ✓ Positive locking device on crawler adjusting bolt.
- ✓ Relay valve in dipper trip vacuum chamber speeds dumping.
- ✓ 3-cyl. GM 3-71 diesel engine with hydraulic coupling furnishes greater, smoother, more economical power (optional) and others.
- and others**

Always a "best buy" because it offers *all* of the construction and operating features that most shovel users want—*plus* Mevac (metered vacuum) power control, the Buckeye Clipper is now better than ever. Buckeye engineers and field men constantly sounding out the hundreds of owners have incorporated feature after feature to make it truly "the users shovel".

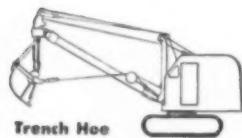
Operators like Mevac control—light touch on small levers actuates vacuum boosters which operate shovel—easy on the operator, easy on the shovel. Faster action, greater yardage. Cuts maintenance costs too. Nothing to freeze, heat-up or leak. Only Buckeye Clippers have Mevac control.

Send for a copy of the new Buckeye Clipper book—pictures Buckeye on all types of excavating, loading and handling jobs—takes the shovel apart before your eyes—explains Mevac control.

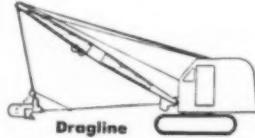


**See You At the Road Show**

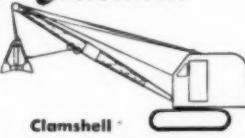
FULLY Convertible!



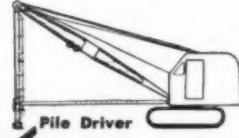
Trench Hoe



Dragline



Clamshell



Pile Driver

**GAR WOOD INDUSTRIES, INC.**  
**Findlay Division**  
**FINDLAY, OHIO**

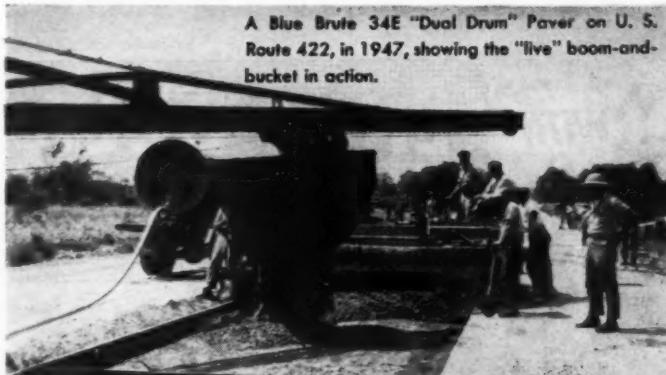
**THERE'S AN AUTHORIZED BUCKEYE SHOVEL DEALER NEAR YOU**

Other Products: Buckeye Ditchers, Spreaders, Finegraders....Gar Wood Scrapers, Dozecasters, Tipdozers  
....Gar Wood Hoists, Bodies, Winches, Cranes, Tanks .... St. Paul Hoists, Bodies, Truck Patrels

**Buckeye**



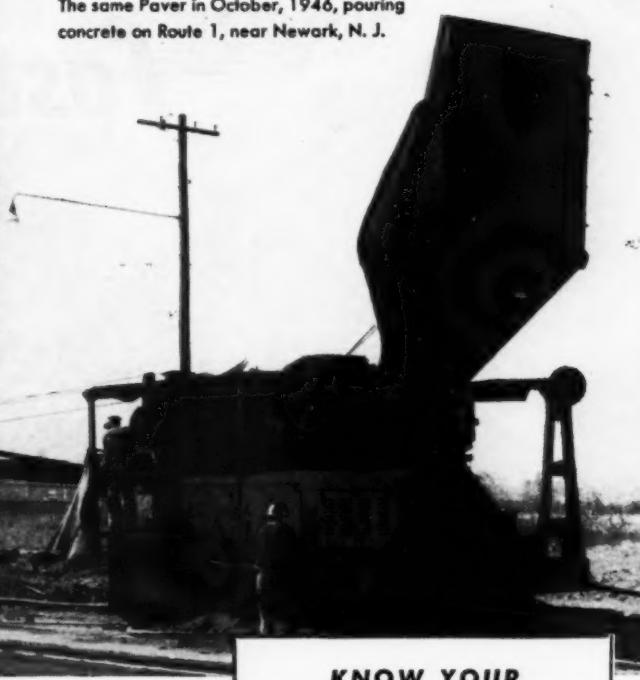
# WHEN A BLUE BRUTE PAVER SET THE PACE...



A Blue Brute 34E "Dual Drum" Paver on U. S. Route 422, in 1947, showing the "live" boom-and-bucket in action.



The same Paver in October, 1946, pouring concrete on Route 1, near Newark, N. J.



No paving job moves faster than the pace set by its paver. That's why S. J. Groves & Sons Co. selected Ransome Blue Brute 34E Dual Drum Pavers for jobs where fast performance was a "must".

Speed counted on the new 3-lane U.S. 422 between New Castle, Pa., and Youngstown, Ohio, delayed by abnormally heavy rains and lack of skilled manpower. Here a Ransome Blue Brute 34E Dual Drum Paver set the remarkable pace of  $\frac{1}{2}$  mile per day. This was the very same Blue Brute, incidentally, that performed a rush job the year before on U. S. 1 near the Newark, N. J. Airport. Here, fast-growing traffic demanded a tremendous widening project in a hurry.

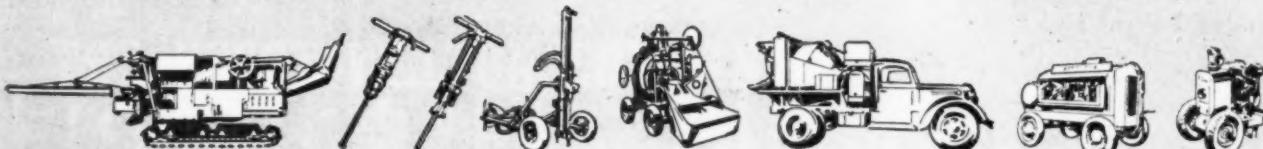
That's where the 34E's many advanced features proved themselves.

For example: *the fool-proof, self-cleaning, fast-charging skip . . . mechanically operated batchmeter for all-weather accuracy . . . precision water-measuring . . . and the exclusive, hydraulically operated "live" boom-and-bucket combination that spreads as it swings, cutting down costly hand shoveling.*

Geared to the output of the Blue Brute Paver, these large-scale paving operations were carried out smoothly . . . economically . . . on time! And that's why a Ransome 34E, Single or Dual Drum, on your own construction jobs will lay more yardage . . . more accurately and with less manpower . . . than any other paver. For full details, see your nearby Worthington-Ransome Distributor, or write for Bulletin 208.

RR-5

## BUY BLUE BRUTES



**IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB**

### KNOW YOUR

## BLUE BRUTES

Your Blue Brute Distributor will be glad to show you how Worthington-Ransome construction equipment will put your jobs on a profitable basis.

### RANSOME EQUIPMENT

Pavers, Portable and Stationary Mixers, Truck Mixers, and Accessories.

### WORTHINGTON EQUIPMENT

Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Self-Priming Centrifugal Pumps and Accessories.

### WORTHINGTON



Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

Distributors in all principal cities

# Huge L. A. Project Goes Ahead

Fast... WITH

**LINK-BELT  
SPEEDER**

**ON THE JOB!**



Swinging a 3½ yd. dragline bucket, this Link-Belt Speeder dragline is loading alluvial soil and shale at the rate of 3000 yds. per day, making way for Los Angeles' unique four level traffic interchange. Next it will place some 15,000 cu. yds. of class A concrete, using a 2½ yd. concrete bucket. Jack Bailer, operator for James I. Barnes Construction Co., says "In 25 years operating experience I never handled a finer rig, and can it travel! . . . steers and cuts into tight places like a crawler tractor . . . has the best traction lock brakes I've ever used. After a nine hour hitch at those Speed-O-Matic Controls, I'm still fresh."

Remember, from the K-585 on down, all Link-Belt Speeder Models are built for fast digging, easy handling, and long life, trouble-free service.

10,000A

**K-585 WITH SPEED-O-MATIC CONTROLS  
EXCAVATES AND PLACES CONCRETE  
ON FOUR-LEVEL TRAFFIC INTERCHANGE**

Keeping every Link-Belt Speeder Shovel-Crane in tip-top operating condition is one of the principal interests of Link-Belt Speeder and its nationwide distributor organization. In every principal city in United States and Canada, and in foreign lands, a stock of parts and men trained in the servicing of Link-Belt Speeder products, are in readiness to meet the needs of the user, wherever located.

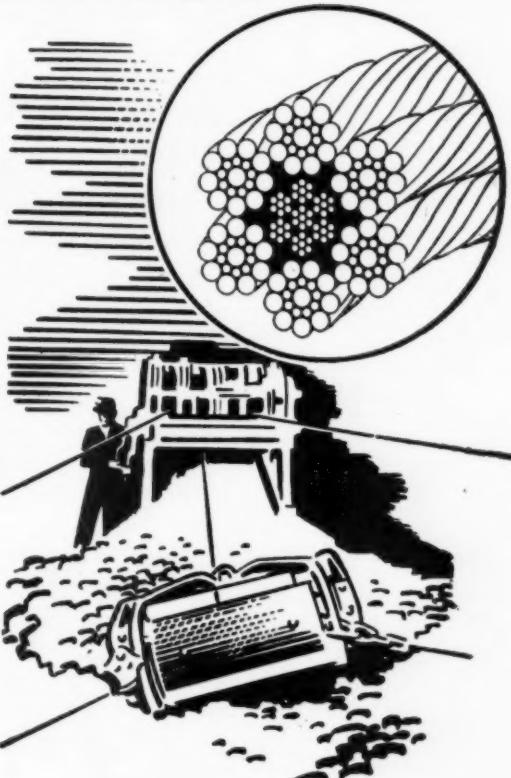
Link-Belt Speeder advanced engineering, honest construction and quickly available service add up to more profitable machine hours and greater returns on your investment.

## **LINK-BELT SPEEDER**

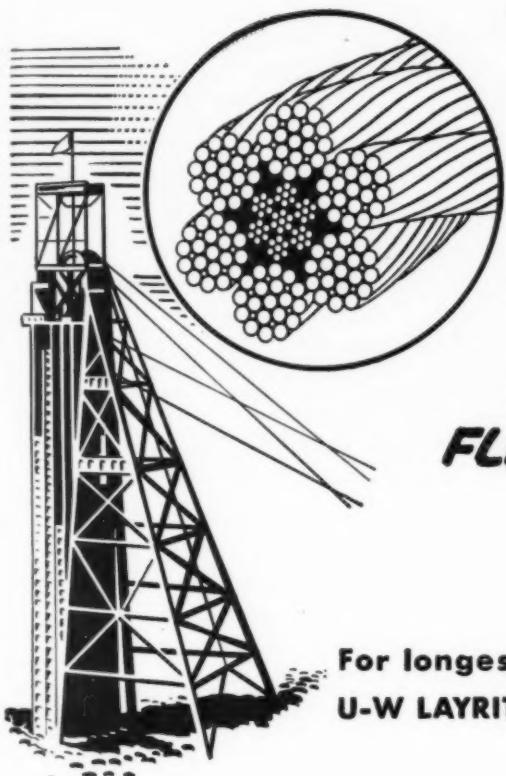


# SOME ROPES FOOL YOU

**U-W 6x19 SEALE IS AN EXCELLENT CONSTRUCTION FOR SLUSHER OR SCRAPER PULL ROPES BECAUSE IT HAS VERY COARSE OUTER WIRES TO RESIST ABRASION**



**BUT...**



**FOR MINE SHAFT ROPES  
U-W 6x19 FILLER WIRE IS BETTER BECAUSE IT IS MORE FLEXIBLE AND RESISTS FATIGUE EXCEPTIONALLY WELL.**

For longest and best service, always specify  
**U-W LAYRITE (Preformed) IMPROVED PLOW STEEL**

We invite you to let UPSON-WALTON engineer your tough rope jobs.

Copyright 1948 - The Upson-Walton Company

## THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

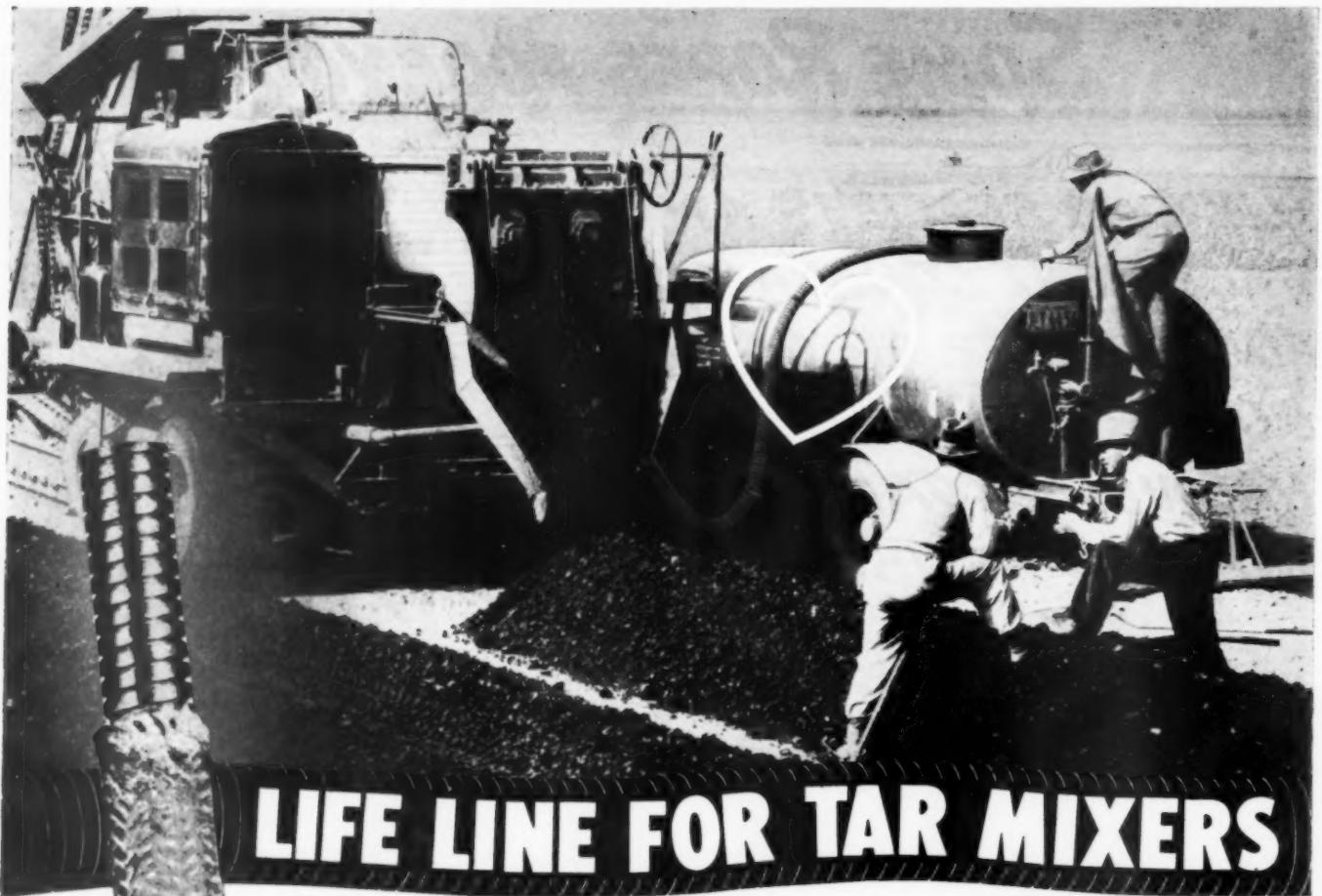
Main Offices and Factory: Cleveland 13, Ohio

114 Broad Street  
New York 4

737 W. Van Buren Street  
Chicago 7

241 Oliver Building  
Pittsburgh 22





## LIFE LINE FOR TAR MIXERS

**Penflex flexible metal hose assures trouble-free transmission of hot tar for road surfacers**

**ON PAVING MIXERS,** Penflex hose is ideal for free-flowing transmission of tar from tank trucks to mixer. Resists crushing, kinking, severe abrasion.

**ON ROAD SPRAYING TRUCKS,** precision-made Penflex offers tight, leak-proof service for filling tanks and for connection to spraying apparatus.

**ON TAR AND ASPHALT HEATERS,** Penflex hand hose, shown on left, prevents dangerous burns to operators using hand sprayers. Sturdy interlocked hose is insulated with heavy braided asbestos. Entire unit is encased by larger diameter hose with heat-proof couplings attached, assuring constant protection and safety.

**48-HOUR DELIVERIES ARE OFFERED** on the above items to meet emergency requirements. Call on Penflex for a complete line of flexible metal hose and couplings for efficient, long-lasting service plus helpful engineering assistance for the solution to your flexible tubing problems. Write today for Bulletin No. 91.

**Pennsylvania Flexible Metallic Tubing Co.**

7216 Powers Lane

Philadelphia 42, Pa.

BRANCH SALES OFFICES—BOSTON • NEW YORK • SYRACUSE • CLEVELAND • CHICAGO • HOUSTON • LOS ANGELES

**penflex... HEART OF INDUSTRY'S LIFE LINES**

Copyright 1948—Penflex Sales Co.

# Another "FIRST" for "QUICK-WAY" TRUCK SHOVELS

with the NEW  
ALL PURPOSE  
SCOOP!

FULL REVOLVING  
CABLE CROWD

MODEL E  $\frac{5}{8}$  cu. yd. and MODEL J  $\frac{3}{8}$

CYD. CAPACITY  
Interchangeable  
with other

"QUICK-WAY"  
ATTACHMENTS



The Full-Revolving, Cable-Crowding Scoop is a valuable addition to other "QUICK-WAY" equipment. This full  $360^{\circ}$  revolving light weight scoop operates as a standard attachment from all angles and in tight places. Standard buckets increase the material handling capacity of your Model E or J "QUICK-WAY" up to 50%; larger buckets available for light materials.

The Scoop has the same rugged simplicity and balanced design found in all "QUICK-WAY" equipment. "QUICK-WAYS" are truck mounted to travel at truck speed and work economically anywhere. Convert in

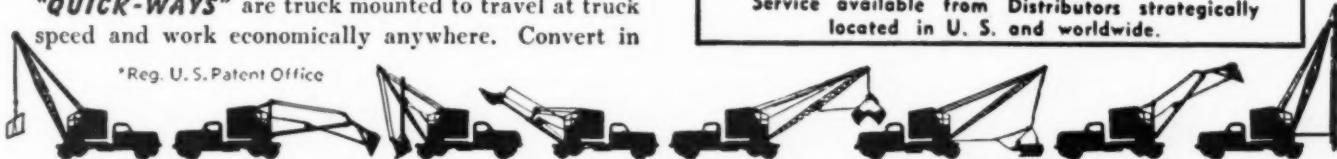
minutes from Scoop to Shovel, Dragline, Trench-hoe, Crane, Clamshell, Pile Driver or Backfiller. No matter what other equipment you own, you need "QUICK-WAYS" too. There's a "QUICK-WAY" owner near you, ask HIM.

*MODEL E: 4/10 cu. yd. cap., mounts on any standard 5-ton truck  
MODEL J: 1/4 cu. yd. cap., mounts on any standard 1½-ton truck*

## "QUICK-WAY" TRUCK SHOVEL COMPANY

DENVER, COLORADO

Service available from Distributors strategically located in U. S. and worldwide.



For speed, portability, economy of operation, and adaptability to a wider range of jobs, nothing of comparable size equals a "Quick-Way" Truck Shovel.

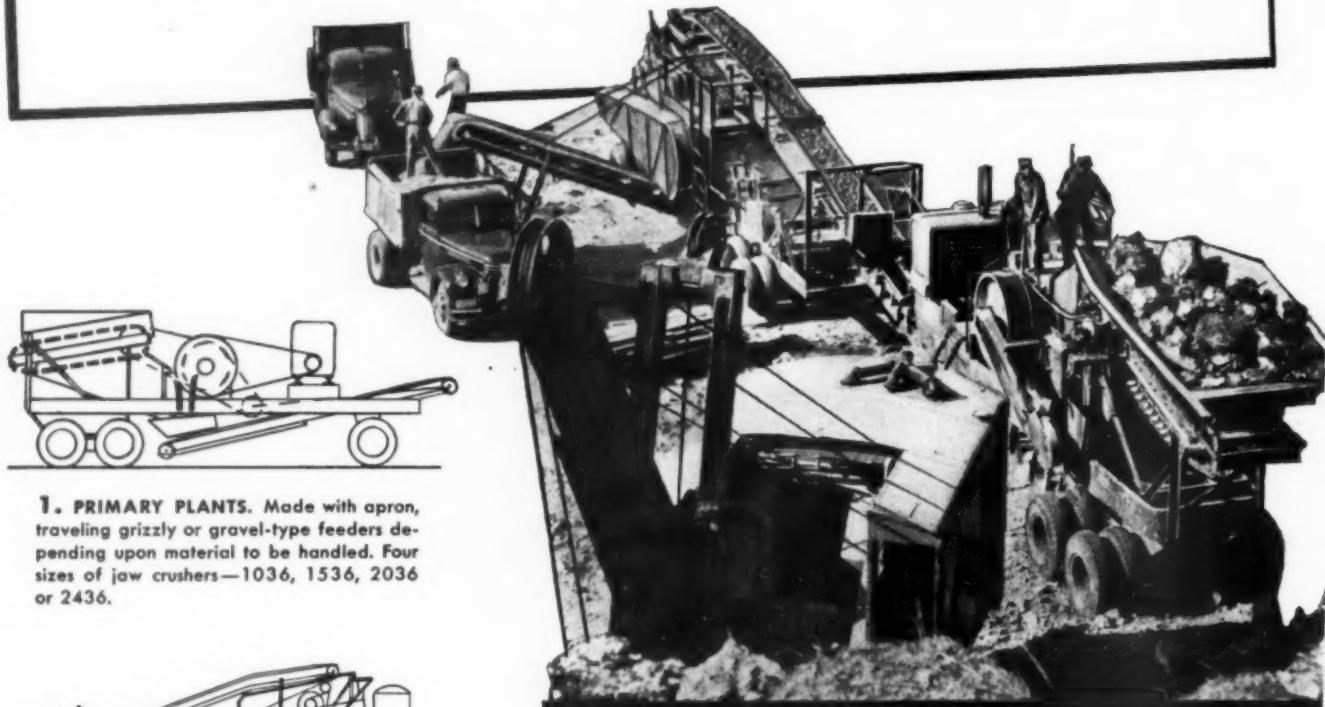
## "QUICK-WAY" TRUCK SHOVEL CO.

DENVER, COLORADO

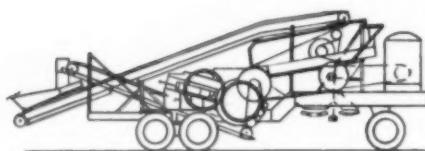
PIONEER IN POWER SHOVELS FOR TRUCK MOUNTING; STILL THE LEADER AFTER 29 YEARS

# CRACK-<sup>MOVING COSTS!</sup> CRUSH-<sup>MORE MATERIAL!</sup>

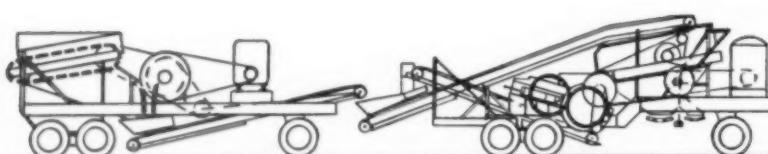
## Pioneer *Continuflow* 2-UNIT PLANTS



**1. PRIMARY PLANTS.** Made with apron, traveling grizzly or gravel-type feeders depending upon material to be handled. Four sizes of jaw crushers—1036, 1536, 2036 or 2436.



**2. SECONDARY PLANTS.** Unique split feed doubles the effective screening area of the 3½ deck vibrating screen. Two sizes of roll crushers available—4022 or 5424.



**3. FLEXIBLE.** Primary and secondary plants operate independently or as a matched and balanced engineered unit. Bigger crushers, larger screens are built into easily moved plants. Result—higher capacities of rock and gravel are now available from portable plants.

Have you ever stopped to figure how much it really costs to move an ordinary rock or gravel plant from one job to the next? When you include your salary, the wages of your crew, gasoline and lost production, you'll conclude that every hour wasted is a mighty expensive luxury.

To lick this problem, PIONEER has developed a complete line of 2-Unit Rock and Gravel Plants. They cut moving costs, meet stringent weight restrictions and *really produce on the job*. PIONEER's new catalog on 2-Unit Plants gives all the facts. Write for it today!

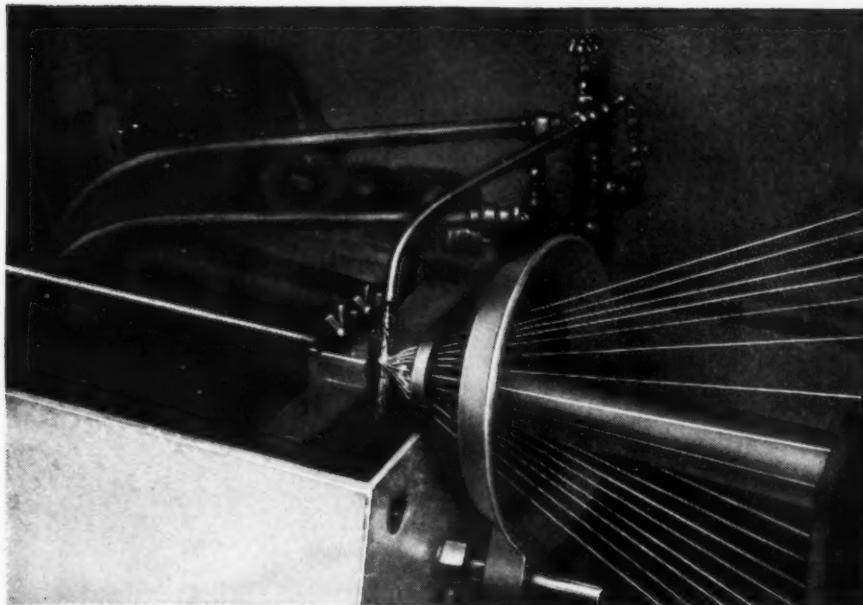
**PIONEER ENGINEERING WORKS**  
1515 CENTRAL AVENUE • MINNEAPOLIS, MINNESOTA

***BUY BOTH!***

Higher Output,  
Lower Upkeep!

# Pioneer

*Continuflow* EQUIPMENT



## Hot Oil Treatment for Steel Muscles

THIS 82-PAGE BOOK ON  
WIRE ROPE IS FREE. WRITE  
FOR YOUR COPY TODAY!

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write—Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.



Field lubrication of wire rope does much to prevent friction and corrosion, but it is only a surface treatment. To provide proper *internal* lubrication, every strand of Wickwire Rope is actually formed in a stream of hot lubricant. This quick-setting lubricant packs the many spaces between the wires of the strand.

Fiber cores, too, are saturated with a compound that lubricates the strands during the service life of the rope. This built-in protection is the result of years of study to develop a lubrication system that would protect ropes against friction, corrosion and other factors which bind ropes and result in loss of strength and rope life.

Thorough lubrication is only one step in the quality control of Wickwire Rope manufacture—but we at Wickwire believe that *every* step is important to assure finished rope that will provide the utmost in performance, safety and long life.

Wickwire Distributors and Rope Engineers are always ready to help solve your wire rope problems and supply the right rope for your needs. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY Preformed.

## WICKWIRE ROPE

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

WIRE ROPE SALES OFFICE AND PLANT—Palmer, Mass.

EXECUTIVE OFFICE—500 Fifth Avenue, New York 18, N. Y.

SALES OFFICES—Abilene (Tex.) • Boston • Buffalo • Chattanooga • Chicago • Denver • Detroit • Emlenton (Pa.) • Fort Worth • Houston • New York • Philadelphia • Tulsa

PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California



# ALL THIS IN JUST 14 DAYS!

WEAVER CRANE SERVICE, Inc.  
CHARLESTON, W. VA.

traveled 750 miles over  
mountain roads — set 31  
underground  
storage  
tanks in

11 West  
Virginia cities with a single  
**MICHIGAN**  
**TRUCK-CRANE**

...half the time required by  
less mobile equipment!

Weaver Crane Service, Inc., operates throughout the state of West Virginia, placing and removing underground storage tanks for a nationally-known petroleum company. They are highly pleased with MICHIGAN'S truck mobility and stamina on the mountainous roads of West Virginia. In the words of Mr. Albert Weaver, "it has given exceptionally good service . . . Had this work been done with a less mobile machine, the same trip

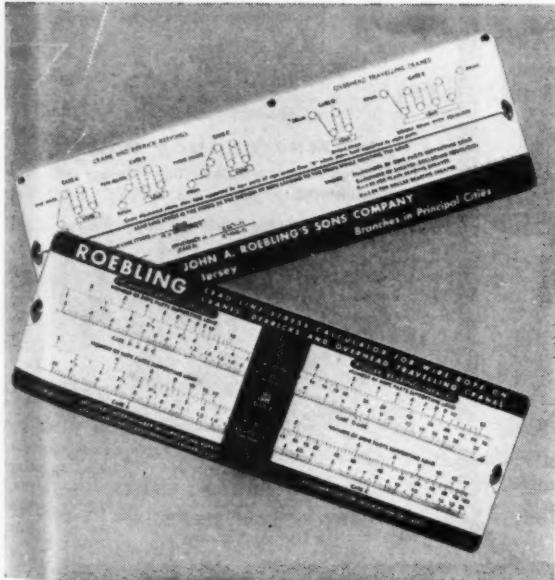
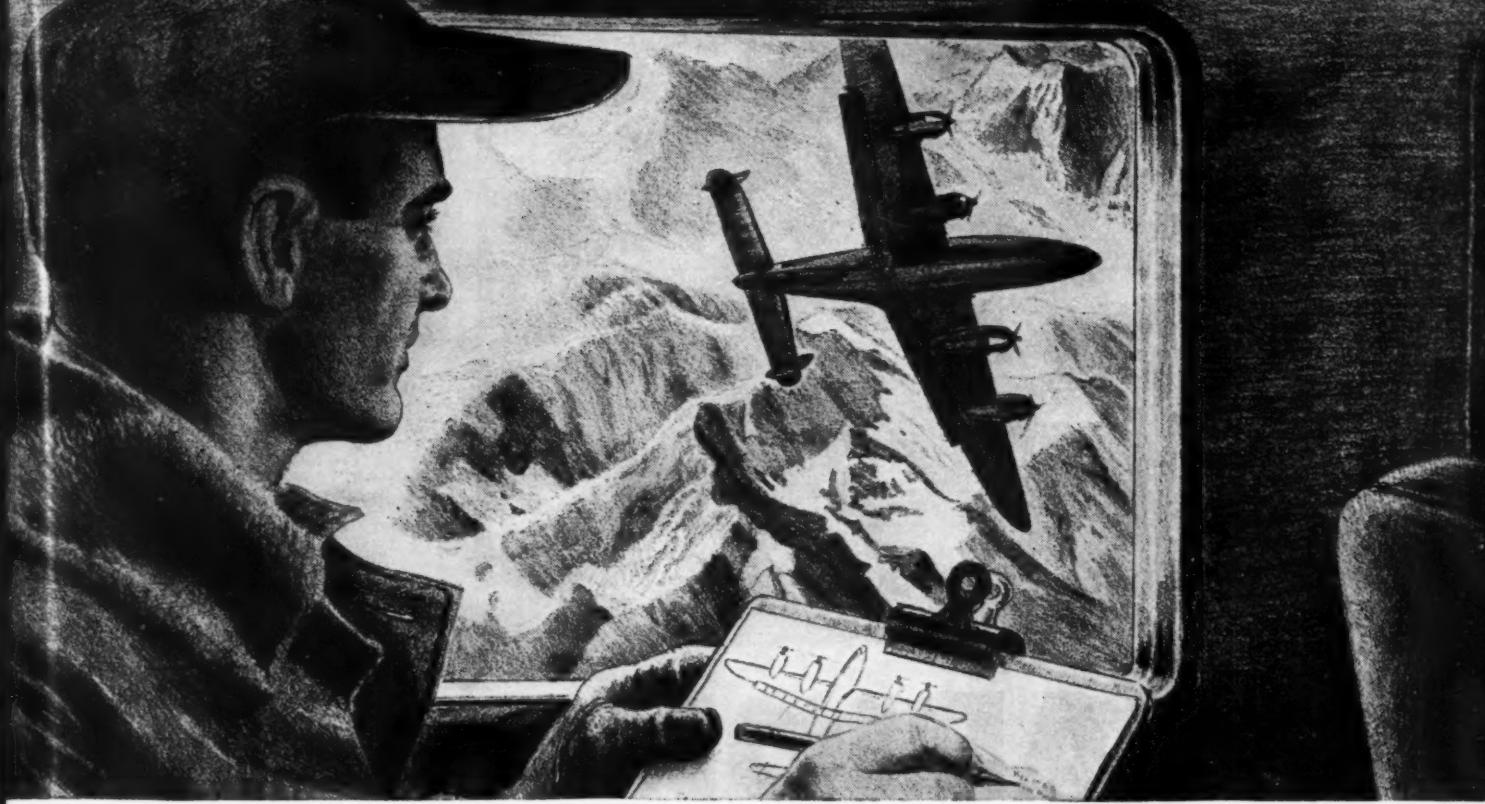
would have taken at least thirty days . . . I am proud of my MICHIGAN Crane."

This is typical of the praise of MICHIGAN Shovel-Crane owners everywhere. Get all the facts about MICHIGAN — ask for your copy of "MICHIGAN ON THE JOB" which graphically shows the wide range of cost-cutting applications of these pioneer mobile shovel-cranes.

# MICHIGAN

MICHIGAN POWER SHOVEL COMPANY  
480 SECOND STREET • BENTON HARBOR, MICHIGAN, U.S.A.

# Confidence—WITH ITS SLEEVES ROLLED UP!



**Y**EAR BY YEAR, planes grow bigger... faster and safer. Man has unbounded confidence in his ability to build better and better planes. Never satisfied, he experiments and tests tirelessly, and aviation progresses.

With similar vision and confidence, Roebling has been pacemaker in the development and manufacture of products essential to the transportation and other industries. The active, widespread confidence it has won among technical men and operators throughout industry is Roebling's proudest asset. Look to Roebling for continued leadership... continual improvement in its products and engineering... continual progress.

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#### WHAT SIZE OF ROPE? HERE'S YOUR ANSWER—FREE

DATA used by Roebling engineers themselves are embodied in this unique "slide rule". It's the Roebling Lead Line Stress Calculator for wire rope... tells you in a moment the safe and economical size of rope for every load... gives the right answer for all types of crane, derrick, and overhead traveling crane installations.

Here's information you can accept and act upon with complete confidence... just as you can specify Roebling "Blue Center" Steel Wire Rope for unsurpassed toughness, dependable reserve strength and the reduction of costly replacement

shut-downs. Roebling was America's first wire rope maker, and "Blue Center" Steel Wire Rope is the finest that Roebling knows how to make.

Write for a Roebling Lead Line Stress Calculator — it's free. And let your Roebling Field Man tell you about installation and maintenance practices that prolong wire rope life. Call him at your nearest Roebling branch office.

**JOHN A. ROEBLING'S SONS COMPANY**  
TRENTON 2, NEW JERSEY  
Branches and Warehouses in Principal Cities

A CENTURY OF CONFIDENCE

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★ WIRE ROPE AND STRAND ★ FITTINGS ★ SLINGS ★ SUSPENSION BRIDGES AND CABLES ★ AIRCORD, AIRCORD TERMINALS AND AIR CONTROLS ★ AERIAL WIRE ROPE SYSTEMS ★ ELECTRICAL WIRE AND CABLE ★ SKI LIFTS ★ HARD, ANNEALED OR TEMPERED HIGH AND LOW CARBON FINE AND SPECIALTY WIRE, FLAT WIRE, COLD ROLLED STRIP AND COLD ROLLED SPRING STEEL ★ SCREEN, HARDWARE AND INDUSTRIAL WIRE CLOTH ★ LAWN MOWERS

**MOVE YARDAGE FAST  
at LOW COST!**



WITH A  
**MARION**  
**33-M**

**$\frac{3}{4}$  YD. SHOVEL**

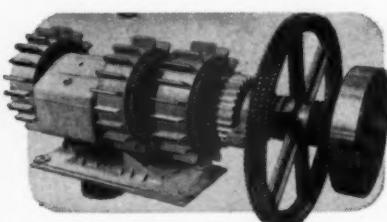
The MARION 33-M is designed and built to meet a vital need for a heavy duty  $\frac{3}{4}$  yard machine that is **FAST . . . VERSATILE . . . POWERFUL . . .** one that will pile up yardage in "nothing flat". The MARION 33-M has many important and modern features that appeal to the contractor. It is sturdily built—easy to operate—easy to maintain due to readily accessible machinery—and is easy to convert from shovel to dragline, clamshell, crane or pull shovel. Write for Bulletin 395. It will give you many reasons why a MARION 33-M should be working for you.

**IMPORTANT  
MARION 33-M  
Features**



**AIR CONTROL**

Every movement is air operated. Simple . . . fool-proof . . . full engine power applied gradually and smoothly to maximum pressure.



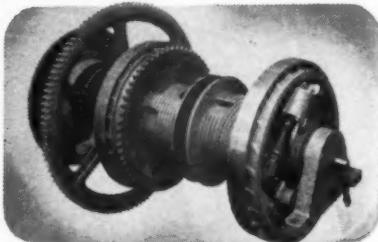
**SWING SHAFT**

Requires no adjustment at any time. Heat-dissipating fins assure cool running clutches.



**INDEPENDENT BOOM HOIST**

High speed raising and lowering of boom independent of all other operations.



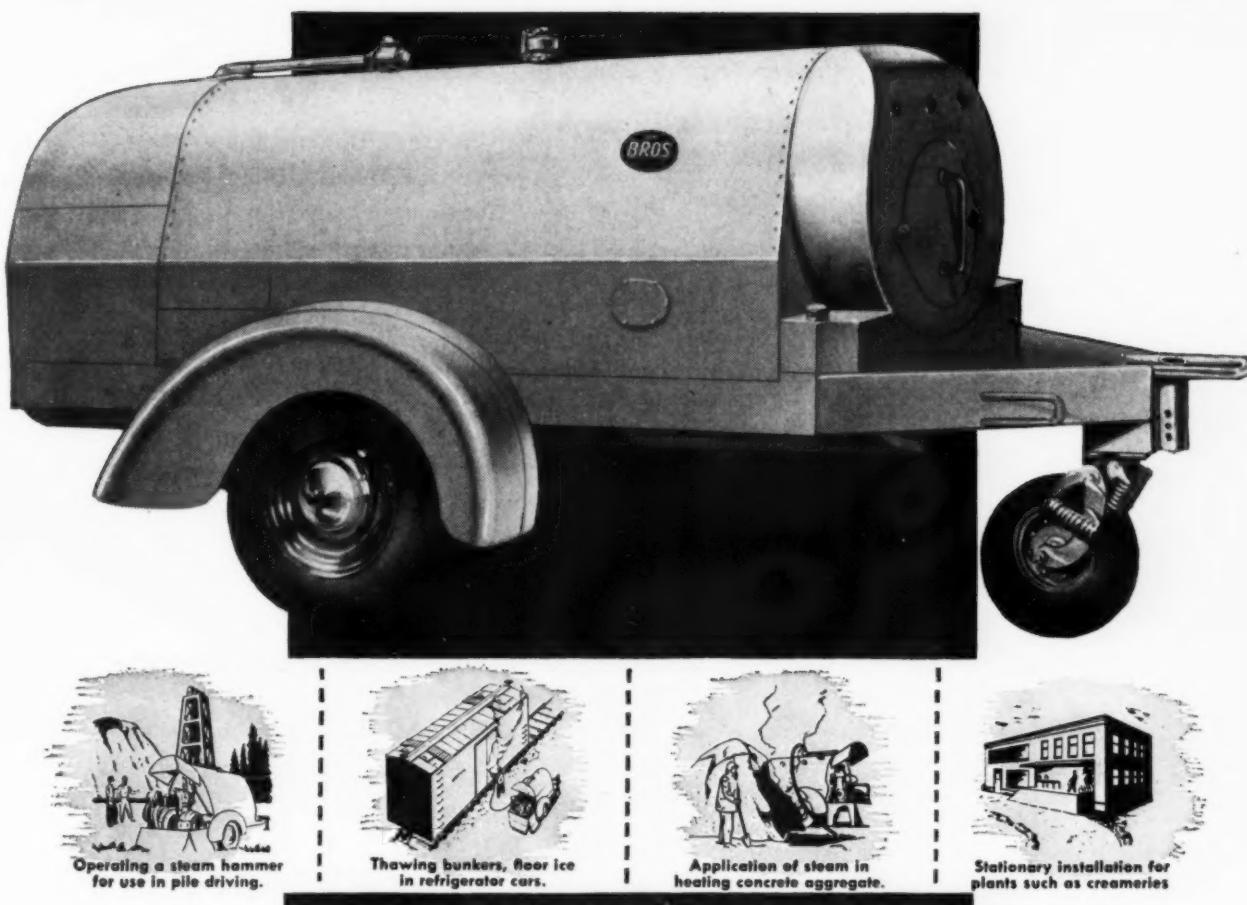
**HOIST DRUM SHAFT**

Anti-friction bearings throughout for free-running and lower maintenance.



**MARION**  
POWER SHOVEL COMPANY  
MARION, OHIO, U. S. A.  
Offices and Warehouses in all Principal Cities • Established 1884

## WHERE CAN YOU USE HIGH PRESSURE STEAM...



### To do more jobs at LOWER COSTS?

Hot . . . Dry . . . Steam . . . at full pressure is a tool . . . a tremendously effective tool . . . an important tool to many contractors, industries and government departments.

And when you put hot, dry steam on wheels . . . when you make it mobile and available to job sites everywhere . . . you have the Bros Steam Generator.

The uses of mobile steam are many. It is used for heating bitumens in tank cars and storage tanks equipped with coils . . . thawing catch basins and frozen culverts, heating concrete aggregate, operating steam pile drivers, heating heavy fuel oils, and small asphalt plants, as a portable steam unit for creamery

or factory sanitation or standby, emergency power unit.

Bros ASME Steam Generators are made in 3 sizes generating 26, 41, and 55 generated H.P. They are of superior design with a two pass, down draft boiler. Larger fuel and water supply. A specially designed steam scavenging separator not only removes water from steam but also purges the boiler water of foreign matter and water concentrates. Special trap permits removal of oil and foreign matter from return condensate. For complete details on the economy and efficiency of the Bros Steam Generator, write Wm. Bros Boiler & Mfg. Co., Minneapolis 14, Minn.

# BROS

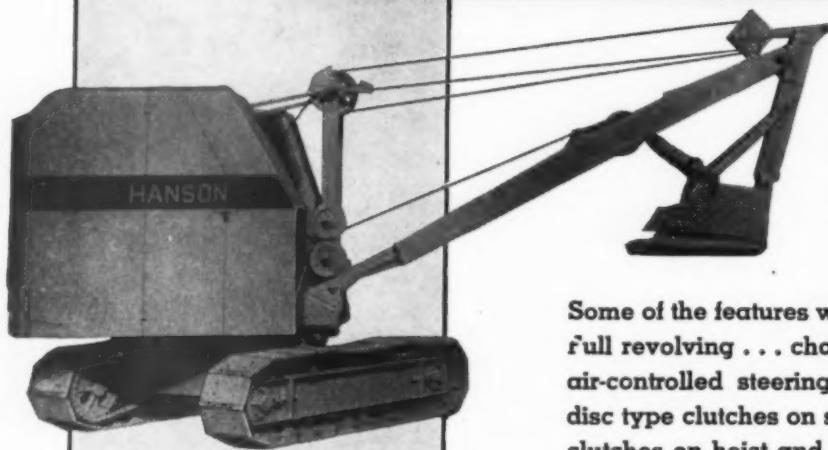
FABRICATORS OF STEEL

WM. BROS BOILER AND MANUFACTURING COMPANY • MINNEAPOLIS 14, MINNESOTA

SINCE 1882



"It's a **REAL**  
**MONEYMAKER**"



# HANSON

CLUTCH AND MACHINERY  
COMPANY, TIFFIN, OHIO, U.S.A.

When put to work on—  
cellars and sewers,  
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drainage ditches.

Where the going is tough and the time  
is short, the stamina, speed and versa-  
tility of this HANSON will appeal to you.  
Made in two sizes,  $\frac{3}{8}$  yd. and  $\frac{1}{2}$  yd.  
Easily convertible to crane (4½ and  
6½ ton), shovel, clamshell or drag-line.

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full revolving . . . chain crowd . . . fully enclosed steel cab . . .  
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disc type clutches on swing . . . internal expansion, booster-type  
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relined without removing shaft assemblies . . . extra long crawl-  
ers and low center of gravity . . . speedy—versatile—rugged!

**LIGHTER**

**STRONGER**

# WELLMAN

Williams Type BUCKETS

Stronger because they're constructed of  
welded rolled steel . . . lighter because  
non-essential weight has been eliminated.  
Wellman buckets meet every requirement  
of heavy service with longer life and lower  
cost! A type for every service: Multiple  
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Special Service.  $\frac{3}{8}$  to 16½ yd. capacity.

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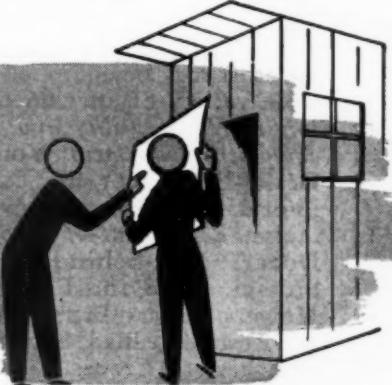


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**2.** Ceco's material data lets you forget detail work—you are supplied with blue prints on reinforcing and other materials, making the job much easier.



**3.** Ceco streamlines road building for you. In one complete order you can specify everything you need. You get materials when you want them, where you want them.

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TYPICAL CECO HIGHWAY PRODUCTS • Welded Wire Fabric • Metal Center Strips  
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## MULTIPLE UTILITY on CONSTRUCTION and MAINTENANCE JOBS

✓ EXTRA-HEAVY-DUTY FRONT END      ✓ EASY HANDLING  
✓ WIDE RANGE OF SPEEDS      ✓ ADAPTABLE FOR MANY ATTACHMENTS  
✓ FRONT OR REAR POWER TAKE-OFF



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The versatile, dependable 27 H.P. RTI and 49 H.P. UTI are the easiest, most economical equipment on many different types of jobs. Famous for low operating and maintenance costs, MM Industrial Tractors may be equipped with a wide variety of attachments and this increased utility also reduces equipment investment! Your MM Dealer-Distributor has complete information on the following attachments: Front-end Loaders, Dozers, Pull-behind Scrapers, Side-mounted and Pull-behind Mowers, Rotary Broom, V-Type and Reversible Blade Snow Plows, Winches and Cranes.



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**STEAM in 2 MINUTES**

From A Cold Start with a  
**"TANKAR" STEAM HEATER**

Model 115



For Unloading Tank Cars

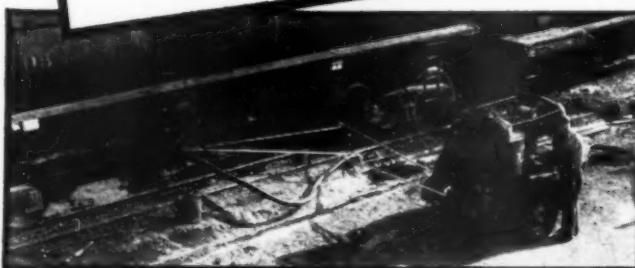
Steam Cleaning  
Snow Removal  
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Stripping Paint  
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No other tank car heater can produce steam as fast as the Littleford "Tankar" Steam Heater. From a cold start, this Unit will produce steam in 2 minutes time at any pressure up to 200 lbs. The "Tankar" Heater is a complete package of steam designed for Unloading Tank Cars of Asphalt, Tar, Emulsion and Road Oils for the Road Construction Industry. In addition to Unloading Tank Cars, the Model 115 has numerous uses as listed above. The "Tankar" Steam Heater does the job faster, is fully automatic, compact and easy to trail. For economy in Unloading Tank Cars, this fast steam producing unit saves time and money on the job.

Heats Tank Cars in  $\frac{1}{2}$  Less Time  
Than Ordinary Units



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"Spray Master" Pressure Distributors

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# Only Dodge gives so much

## VISION...

New Dodge "Pilot-House" cabs give you nearly 200 square inches more windshield area than other standard truck cabs! You get tremendously increased vision . . . in all directions. Windshields and windows are higher and wider. Available are new rear quarter windows that add still more to vision, and to safety . . . and vent wings on the door windows for controlled ventilation.



## COMFORT...

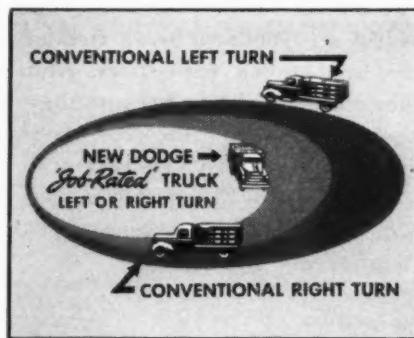


Comfort? Riding is believing! New and better weight distribution, wider tread axles and longer springs give a marvelous new "cushioned ride." "Air-O-Ride" seats give the kind of seat cushion you want—"soft," "medium," or "firm," controlled by a convenient lever. Seven full inches of seat adjustment provide exactly the right legroom. *All-season* comfort is yours, too, with "All-Weather Ventilation," an ingenious combination of truck heater, defroster vents, vent wings, and fresh air intake.

- |  |  |
|--|--|
| <b>1 PLENTY OF HEADROOM</b>  | <b>4 PROPER LEG SUPPORT</b><br>... under the knees where you need it.      |
| <b>2 STEERING WHEEL</b><br>right in the driver's lap.                                    | <b>5 CHAIR-HEIGHT SEATS</b><br>... just like you have at home.             |
| <b>3 NATURAL BACK SUPPORT</b><br>... adjustable for maximum comfort.                     | <b>6 7-INCH SEAT ADJUSTMENT</b><br>... with safe, convenient hand control. |
| <b>7 "AIR-O-RIDE" CUSHIONS</b> . . . adjustable to weight of driver and road conditions. |  |

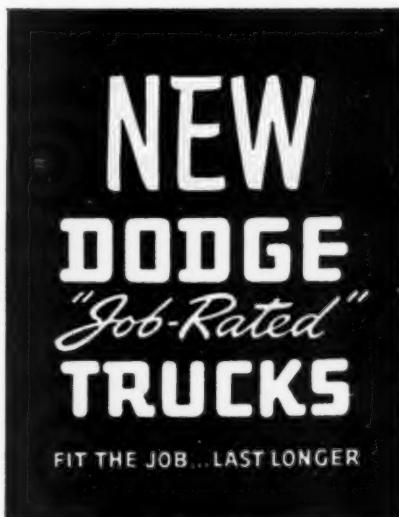
## EASE OF HANDLING

You can turn these new "Job-Rated" trucks in much smaller circles. You can park, back into alleys or up to loading platforms with much greater ease. This is due to a new type of steering design, with shorter wheelbases, that accommodate full-size bodies. You get much better weight distribution, too. Front axles have been moved back and engines forward, placing more weight on the front axle.



You get a truck that fits your job—saves you money . . . because every unit of every Dodge truck, from engine to rear axle, is "Job-Rated" for economy, dependability, performance, and long life. And remember . . .

**only Dodge builds "Job-Rated" trucks!**





**BUY and SPECIFY**

**GOOD YEAR**

—it pays!



#### A RIGHT TIRE FOR EACH JOB



**SURE-GRIP**  
for maximum traction  
on drive wheels.

**HARD ROCK LUG**  
for super-stamina in  
all rock work.

**H**ARD ground? Soft clay? Giant loads? Fast schedules? No matter what the job conditions, you will find no tire for the wheels of drawn vehicles, or for general traction, excels the "roll" ability and stamina of Goodyear's All-Weather Earth Mover. It's the job-proved specialist that moves big loads fast and sure at bedrock cost. Reason? Its wide, rounded contours provide maximum flotation,

prevent deep penetration of the ground surface, reduce skids and slippage, give surefooted going.

Fact is, All-Weather Earth Movers — like all Goodyear work tires — are first choice with users. And they stay first choice because they keep on delivering low-cost, long-life performance. That's why year after year, *more yards are moved on Goodyear off-the-road tires than on any other kind!*

# GOOD YEAR

MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND

All-Weather, Sure-Grip  
—T.M.'s The Goodyear  
Tire & Rubber Company

# 457,000 Sq. Yd. Concrete in One Season —with a Single Crew!

**Best run: over 8 miles of 20-ft. slab in less than 30 calendar days. Koss Construction Co. credits modern equipment, mobility between jobs, good management for big 1947 achievement.**

In a state road program the rumor often gets around that "Blank Construction Co. sure has a cracker-jack outfit." The stories circulating lately in Iowa offer a case in point. Koss Construction Co. of Des Moines, indeed had an outstanding run in 1947, having placed over 457,000 sq. yd. of 8"-10"-8"-10" concrete pavement in four projects during the season, with just one of its several paving crews.

On the hunch that it wasn't due merely to weather breaks or doubling up with more men and equipment, we checked into this firm's methods and equipment a bit.

In describing the past year's work, the company's vice-president, Richard B. Koss, credited good equipment excellent personnel and especially between-job mobility of the outfit for the good showing. This firm has spent the last year or more building up its outfit, having plowed a huge sum of money into replacements and into assembling mobile, balanced units and a smooth-working organization. While he modestly made no mention of the factor of management, it would seem that old-fashioned alertness, planning and "know-how" are the real reasons for the results.

## Began in March

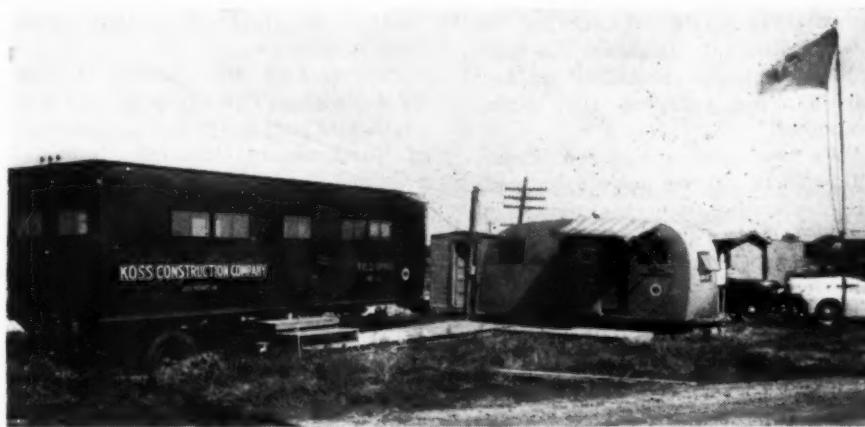
In describing the operations of the "457,000-yd." crew, Mr. Koss said that this total yardage was spread

over four separate projects — two for the Missouri and two for the Iowa state highway commission. The crew started production March 11, 1947, and completed their run on November 5, 1947. During this period all kinds of weather was experienced. The first part of the season was extremely wet. "We had some good weather in the fall, which was followed by an unusually early winter," he recalled. "We finished the last project on Nov. 5, and then shut down for the winter, although normally we would have had more construction weather after that date. Al Beuerlein is general superin-

tendent for the outfit mentioned in this story. We constructed 20' 22' and 24' width pavement. Inasmuch as all of the equipment is adjustable for 20' to 25' widths, this was not much of a problem except for the time which it takes to adjust the equipment. The best sustained production run was in Floyd County, Iowa, where slightly more than eight miles of 20-ft. slab were laid in less than thirty calendar days. While we are glad to get this kind of run, from the overall picture we are more interested in sustained production."

## Quick Job Changes

One of the problems encountered by the contractor in highway paving is the fact that the majority of the jobs involve small yardages, and the length of time it takes to move from one job to another seriously curtails



★ In keeping with the snappy streamlined methods of Koss Construction Co., this firm sends complete daily records to Des Moines headquarters from the field office trailer at the left. Its equipment includes latest accounting machines. At right is the general superintendent's office trailer



★ One of fourteen closed-body and flat-bed semi's and trailers used by this contractor to save time and expense on between-job moves. Note use of large many-colored signs which plug modern highways, AGC membership, and the National Safety Council.

the production schedule. Mr. Koss commented on this point, saying, "We operate a fleet of International trucks and Fruehauf trailers in order to cut the moving time to a minimum. We have both the 30-ft. standard flatbed trailers with tandem axles and several lowboy trailers. We ship very little of our equipment by rail, with the exception of the Koehring 34E double-drum pavers and the cranes for the plant site. Also in an endeavor to get everything on wheels, we have had Fruehauf construct two 28-ft. office trailers, which we use as field offices. These trailers are complete offices in every respect, and contain all of the mechanical equipment we can get to make out the various reports needed for our own use and for the highway departments."

#### Koss' Equipment

Mr. Koss describes a typical list of equipment for one of their paving outfits: "We haul our own batches on our paving work, and have with each crew a minimum fleet of 12 International K-6 and K-7 batch trucks. We use an RB-20-25' subgrader; one or two 34E Koehring pavers, depending on the nature of the work; Jaeger 20-25' concrete spreader; Jaeger 20-25' finishing machine; Koehring 20-25' longitudinal finishing machine; and various makes, including our own machine, for spraying the curing compound.

"We have from one to four Caterpillar No. 12 motor patrols on each job, depending upon the nature of the work. Also a Caterpillar D-7 bulldozer and a Caterpillar D-4 with bulldozer.

"Road forms are lifted and deposited on the roadbed with a flatbed truck equipped with power winch and small derrick. At the plant site we use two 1½-yd. cranes with Johnson bulk cement plant and Johnson bins and batchers. Our general procedure is to place all the equipment on a project that can be efficiently used. When we get on city paving sections,

which are let by the highway departments, we, of course, have to have additional special equipment such as Barber-Greene ditching machine, Koehring backhoe, Novo paving breaker, and Jaeger 2-yd. readymix trucks. Here again the type and number of individual pieces of equipment will vary with the type of work which we have to construct."

The Koss firm is working in Iowa, Missouri and Kansas, and expects to place between 800,000 and 900,000 sq. yd. of concrete pavement during 1948.

#### Plans Shaping for International Soils Conference

Tentative program details and names of most of the U. S. delegates have been announced for the Second International Conference on Soil Mechanics. The Conference will be held at Rotterdam, Holland, June 21-30. This meeting marks a resumption of a world-wide cooperative effort begun with the first conference at Harvard University in 1936.

Dr. Karl Terzaghi of Harvard will again head the conference as president; T. K. Huizinga of Delft, Holland, is secretary.

Representing this country is the U. S. National Committee on Soil Mechanics of which Phillip C. Rutledge of Northwestern University is chairman and Howard Bell of N. U. secretary; Mr. Rutledge is chairman of the executive committee, T. A. Middlebrooks, Corps of Engineers, Washington, D. C., is vice-chairman; members include R. F. Blanks, R. F. Dawson, C. A. Hogentogler, F. A. Marston, D. W. Taylor and W. J. Turnbull, with Arthur Casagrande as special adviser.

Following is a list, in some cases not complete, of official delegates selected as of late February:

Amer. Soc. C.E.—R. E. Bakenhus, J. D. Justin, F. A. Marston, C. S. Proctor.

Amer. Soc. for Engineering Education—R. F. Dawson.

Amer. Soc. for Testing Materials—F. J. Converse, W. S. Housel, E. J. Kilcawley.

Highway Research Board—C. A. Hogentogler, A. W. Johnson, M. G. Spangler.

Corps of Engineers, War Dept.—G. E. Bertram, T. A. Middlebrooks, R. R. Philippe, W. J. Turnbull.

Bur. of Yards and Docks, Navy Dept.—L. C. Coxe, L. A. Palmer.

Civil Aeronautics Admin.—Henry Aaron.

The Panama Canal—J. H. Stratton. U. S. Geological Survey—E. B. Eckel.

U. S. Bureau of Reclamation—R. F. Blanks, K. B. Keener.

Amer. Road Builders' Assn.—O. J. Porter, E. F. Bennett.

Amer. Institute of Consult. Engrs.—(to be chosen).

Conference topics will include papers on theoretical subjects, laboratory investigations, field studies, stability and deformation of embankments, earth pressures against walls, building foundation, road and runway problems, improvement of soil properties (by mixing, tamping, vibration, chemicals, etc.), ground water observations, worldwide survey of soils engineering facilities and personnel, international collaboration.

#### 1947 Traffic Toll 32,000

Traffic accidents took 32,000 lives in 1947, a drop of 4% from 1946, according to the National Safety Council. This toll, while large, is still almost 1,500 less than the 33,411 deaths in motor vehicle accidents during 1946. The reduction was accomplished despite a rise in travel in 1947—approximately 9% higher than in 1946. This represents a 12% decrease in the mileage death rate as compared with 1946.

The contrast with prewar experience is even sharper. An increase of 11% in miles of travel over 1941 was associated with a decrease of 20% in the death total.

#### \$9,200,100 Repaving Program in Chicago

The largest repaving program since 1937 is to be undertaken this year by the street department of Chicago, Ill. It is proposed to repave 27 miles of streets at an estimated cost of \$9,200,000. In addition, \$2,150,000 will be spent on maintenance and resurfacing 200 miles of streets.

Last Year What Was Your

# Fastest Yardage?

Many contractors shifted into high. A few examples of notably fast or efficient jobs reported on highway, airport and other work during 1947. Did you do as well—or better? Send us details of runs your men are particularly proud of

**C**ONTRACTORS in many parts of the country had bum weather breaks in 1947. But despite rain and mud, and despite easy-on-the-shovel workers, union restrictions and some lingering shortages of equipment (and rail cars), not a few outfits rolled with noteworthy speed. New and improved postwar scrapers, shovels, dozers, trucks, pavers, loaders, spreaders, finishers, etc., etc., etc., were beginning to bring about a noticeable speed-up in progress rates.

000 project in two months; in September earned \$259,000, the maximum ever earned by any firm on any single N. C. highway project, including bridge work, in a month. Unit bid was \$2.63 per sq. yd.

J. C. O'Connor & Sons, Inc., of Fort Wayne placed 52,656 sq. yd. of 9-7-7-9 r. c. concrete pavement on an Indiana road job during October.

Moellering Construction Co., of Fort Wayne, placed 40,650 sq. yd. in October.

Ryan Construction Co. of Evansville, Ind., made a nice 30-day run, putting down 56,461 sq. yd. of r. c. concrete slab from July 15 to Aug. 15.

Berns Construction Co., Indianapolis, laid 36,380 sq. yd. in fifteen calendar days, July 1 to 15, and 23,483 sq. yd. in another half-month period. Berns' contract and Ryans' adjoining contract, totaling 200,000 sq. yd. for the year, were built with the same single paving crew. In the 3½ summer months to Sept. 30, the combined progress was 189,024 sq. yd., or 54,000 sq. yd. per month.

## 26,224 C. Y. Week on Patterson Field Concrete

The concreting of Patterson Field's massive 21-in. concrete runways and 25-in. taxiways at Dayton [R and S, July '47] reached a peak of 5,240.84 cu. yd. of concrete placement for the best day, Sept. 11; and 26,224.98 cu. yd. for the best 6-day week, Oct. 20-25. W. L. Johnson Construction Co. used two 34-E dual-drum pavers alongside the 25-ft. lane strips, aided by three similar pavers set up as a central mixing plant

Porter-DeWitt Construction Co. of

Poplar Bluff, Mo., in grading on U. S. 66, Crawford and Franklin Counties, Mo., moved about 450 c.y. per hour on 10-hr. shifts with three LeTourneau FP scrapers and two Tournapulls. Six Euclid wagons and a Euclid loader moved up to 400 c.y. per hour in excavation not well suited for this type of equipment.

This 10.199-mi. arterial highway grading and paving job involved 630,000 c. y. excavation, 80,000 c. y. being sandstone. Also 41,000 tons clay-stabilized aggregate for 4" x 26' base. Job included culverts and bridges. Concrete paving sublet.

Earthmoving units: 4 Tournapulls, 3 LeT FP scrapers with Caterpillar D8 tractors, 2 LeT K30 rooters with D8's; one Lima with 3 Euclid wagons, one Euclid loader with three Euclid wagons; three No. 12 Cat. Auto Patrols, 4 LeT SF rollers pulled by assisting equipment. W. R. Stoune, super. J. J. Krebe, Prof. engineer. Rock outfit included three 315 cf. compressors (Chicago Pneumatic, Schramm and I-R), one 210 cf. Jaeger compressor, 2 I-R 71 wagon drills, one Cleveland wagon drill, 6 I-R jackhammers for secondary drilling, I-R steel and bits.

With a top day's pour of 4,571 sq. yd. in 9½ hours, using a 34E-1A Koehring Twinbatch paver, Koch Construction Co. of Milwaukee made good time on 11.626 miles of 7" x 20' concrete slab on U.S. 8 in Wisconsin. Located in Price and Rusk counties, this job included 136,436 sq. yd. of concrete, 12,278 c. y. shoulder embankment, 21,620 c. y. gravel base for shoulders, and 2,014 lin. ft. pipe underdrains, etc.

Project bid in July, equipment moved from other jobs in Wisconsin and Ohio and paving begun Aug. 25. Pavement aggregate production was

## Carolina Contractor Sets Record

In N. Carolina, a three-ply record was reported in *The Carolina Roadbuilder* for maximum square yardage of p. c. concrete highway constructed in this state by one crew (1) in a single day, (2) a single week, and (3) during month of October. It was set by Rea Construction Co., of Charlotte, on a 13-mile stretch of U.S. 74. Announcement of the record was made by W. Vance Baise, chief engineer, who further revealed that another record was set on the same job for maximum payment earned by a highway contractor on one job during one month.

The job included an 8-in. non-reinforced slab 22 ft. wide with a longitudinal tie-bar joint and transverse contraction joints on 30-ft. centers without expansion joints. A dual-drum paver was used to pave the lanes simultaneously. Spreader, finisher, longitudinal float, and spray-curing machine put in the finishing touches. Setting a new record for N. Carolina, the contractor progressed 2,300 ft. in a single 12-hr. day. During a period of four 6-day weeks, more than 2,000 ft. of slab was put down every day those weeks. Slowest day, 1,800 ft.

The contractor completed the \$560,-

sublet, and another contractor's outfit was used to crush shoulder base material. Koepke Sand and Gravel Co. of Appleton, the "sub," used a Koehring 303 shovel, Ford trucks, Telsmith 9A crusher and screening unit, Lippmann washing plant, Caterpillar D8 tractor and bulldozer, LeTourneau scraper, Gould centrif. pump, etc. Water for washing sand was pumped 1.7 mi. through 6-in. spiral welded pipe.

Equipment from Otto Weisner of Superior, Wisc., used for shoulder gravel, consisted of a Pioneer 1535 portable crushing plant, a Cedar Rapids stabilizing plant, and Link Belt shovel. For fine-grading Koch used an Allis-Chalmers "L" tractor with Gar Wood scraper, A-C "K" tractor with scarifier, Caterpillar tractor with dozer, and R. B. subgrader.

Toward the end of the run, frosty nights delayed starting until sometimes 10 A.M., and the job often was shut down early. Final pour for the 136,436 sq. yd. was made Oct. 24, or just two months after the start.

A rather speedy Nevada job was the 16-mile relocation in Elko, let to Silver State Construction Co. of Fallon, Nev., A. D. Drummond, owner. Contract was awarded May 10, work started May 15. Grading was begun June 10 and completed Sept. 29, or a total of 93 working days. Practically all contract completed by Oct. 25. Job included 590,000 c. y. roadway exca., 162,000 tons pit-run base, 76,000 tons crushed gravel surface (1" max.), 27,650 tons plant-mix asphaltic surface, 600 c. y. class A concrete. A 6-mile road-mix surfaced detour was built by the contractor before any excavation could begin.

Said to be a record pipeline job of sorts, was the Michigan project (reported by *Michigan Contractor & Builder*) of Johnson, Greene & Co. of Ann Arbor and Walter Toebe & Co. of Lansing. It was the Saginaw-Midland pipeline laying job south of Pine River. Using a new Northwest pull-shovel the crew laid 46 pieces of 48-in. steel pipe in 10 1/2 hours (736 ft.) exceeding the previous day's run of 43 pieces in 14 hours set by Charles F. Smith & Son of Dayton, Ohio. Al Cicchini, superintendent; L. M. Brenner, engineer.

Said to be a record-breaking quantity of asphaltic concrete ever to be placed in one year on one job, hot-mix pavement on the Maine Turnpike

totaled 1,360,000 sq. yd. in 1947 [Sept. '47 R & S]. Four hot-mix plants turned out an average of 30,000 tons or more per week, with a peak day of over 6,500 tons. This tonnage and yardage was for 7"-8" depth of material on a 4-lane divided highway 48 miles in length.

•

a Koehring 34E dual-drum paver, or 4,302 sq. yd. (1760 lin. ft.) in 10 hours. This job averaged 145 lin. ft. per hour; 266,000 sq. yd. in the project.

The other project included 15.96 miles of 7"x20' slab on U.S. 8. Some 187,000 sq. yd. of concrete was placed at an average of 162 lin. ft. per hour, with as high as 200 lin. ft. in one 9 1/2-hr. day. Approximately 9.6 miles of slab completed in 39 partial or full paving days, from Sept. 17 to Nov. 1, in spite of fall conditions necessitating short working days.

Supt. for both jobs was J. J. Isabella, and W. A. Sanborn and Donald Joyle were resident engineers, respectively, on the two projects.

## National Groups Study U.S. Airports

Fifty young Philippine citizens and 30 from the Latin-American republics will begin instruction at the Civil Aeronautics Administration's Aeronaautical Center at Oklahoma City about May 20.

They will be trained in air traffic control, airways communications and airways maintenance under appropriations for the rehabilitation of the Philippines. Their training will include both classroom instruction and practical on-the-job training.

### Another Wisconsin Job

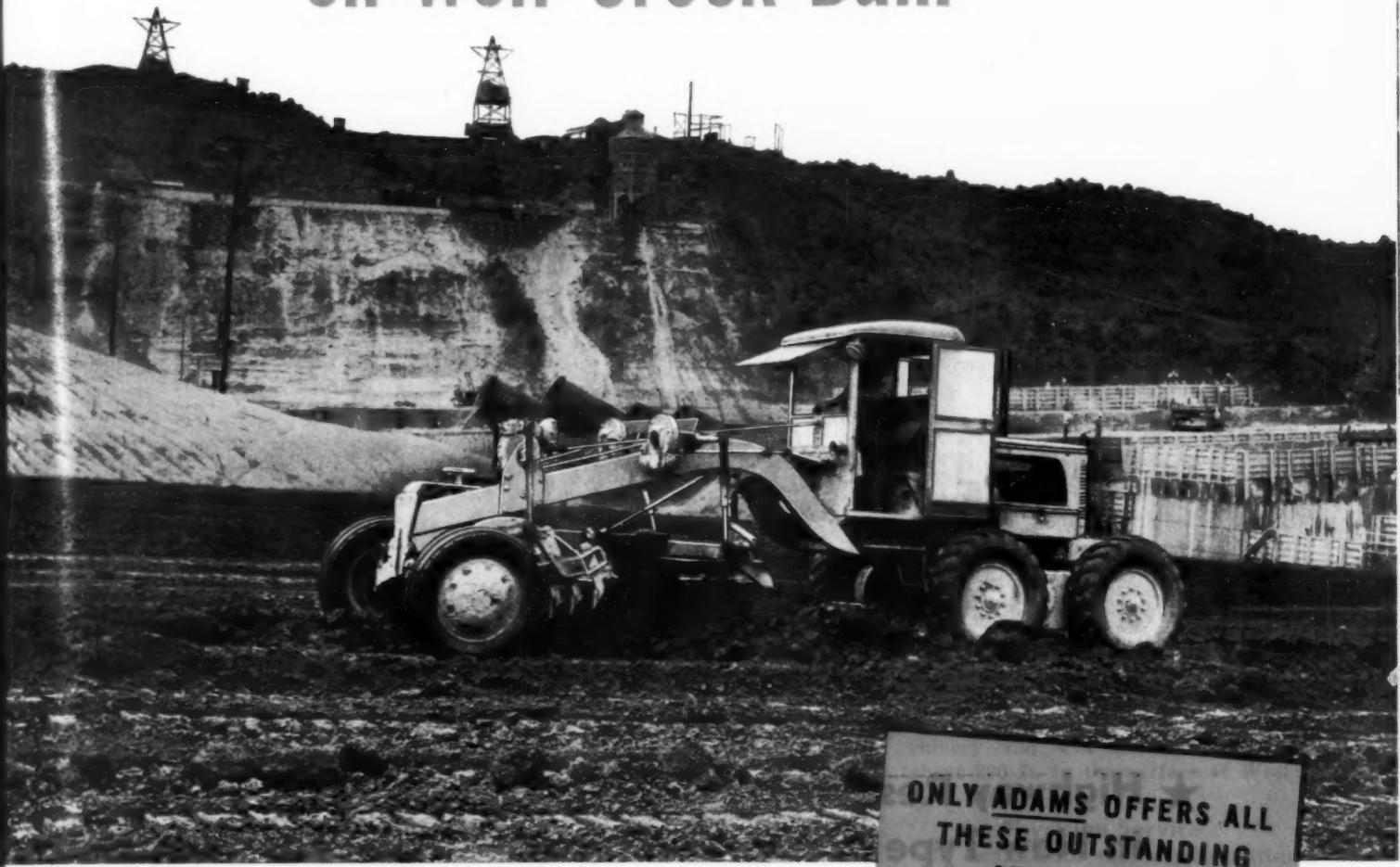
Fast concrete placement was also reported by N. M. Isabella, contractor of Madison, Wis., on two paving jobs in 1947.

One job consisted of 20.89 miles on Highway 30, the slab being 8" x 22'. The fastest day was 692 batches with



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# Adams



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## EDITORIAL

### ★ Roadbeds Must be Heavier

Statistics on truck production for 1947 are highly significant to highway designers. The fact is that a larger and larger percentage of the entire output of manufacturers is in the heavy load capacity range. That this trend is immediately ascribed to an effort to make the most out of the stringent sheet metal supply and to other temporary factors, is beside the point. Over-the-road truck and trailer operators have found that it pays to

carry more freight per trip to keep down their overhead.

During the war we had the spectacle of a sudden and dramatic increase in both the number and weight of truck-loads on arterial highways. Roadbeds took a terrific beating, and many inadequacies of design showed up. Axle loadings are now back to peace time limits, but the percentage of axle loads that will be up near the limit remains high and will probably go higher.

All this means two things. It means that arterial pavements must be adequately designed to anticipate this trend; safety and fatigue factors are more in the spotlight. And it means that there is really no such thing any more as a light-traffic road. Even the lesser-traveled side roads will have to support more and more frequent passages of big-tonnage trucks serving the farming and commerce life of rural areas.

### ★ Gas Tax Raises

It was bound to happen, and apparently it is happening—more and more states are the scene of efforts to increase the gasoline tax. Kentucky's tax advances from 5 to 7c on April 1. Legislative bills to raise the present

tax are being considered in Massachusetts, Missouri, Michigan, Illinois, Mississippi and possibly other states.

Undoubtedly, the increased revenue is needed in each of these instances. Immediate raises in gas tax revenues

are needed now as an expedient in some states. But the best way to go at highway financing problems is the way being used in Michigan—a thorough engineering analysis of long-range need, as a basis for legislative proposals.

### ★ Highway Research Board in New Type Cooperation

Without particular fanfare, the Highway Research Board has branched out into a more cooperative type of effort in recent months. As an example, they have acted as a joint sponsor for the very successful highway conference at Salt Lake City recently, in cooperation with the state highway

department and the University of Utah. It also was a joint sponsor with the American Road Builders' Association of a soils, compaction and construction machinery conference in San Francisco, April 8 and 9.

This organization is now linked with almost every national organization in

highway engineering and contracting. Other organizations are likewise becoming increasingly linked through cooperative committees or joint meetings. This is a sign that our highway industry and profession have grown up. It should accelerate results for everyone concerned.

### ★ Another Remarkable Highway Report

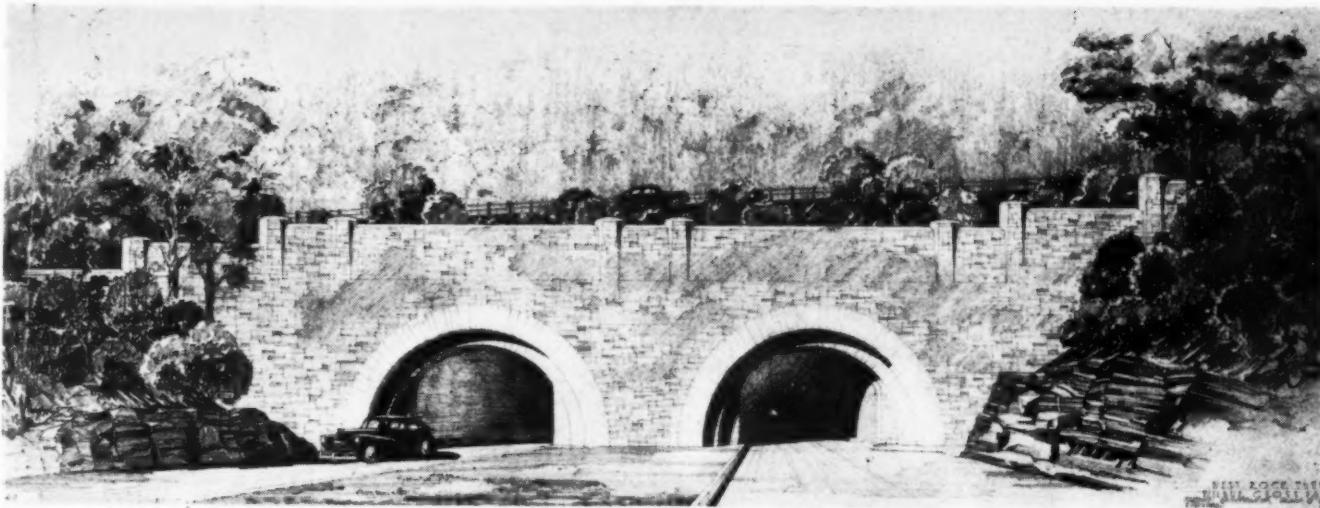
The analysis and report of long-range highway needs in Michigan, reviewed elsewhere in this issue, marks another milestone in public service in the field of highway development. It should give citizens reason to pause and be thankful that such skillful and inspired organized effort has been going on in their behalf.

What happened in Michigan is that a committee took the state of Michigan to a clinic, put it through X-ray and metabolism tests extending over

a period of a year, and came up with a tough prescription. The patient, it seems, is suffering from a severe case of hardening of the arteries (highways) but can be cured if his governor and legislature have enough public spirit and leadership to put the patient through a 12-year course of treatment. Treatment in this instance will require \$180 million a year for 12 years, or nearly \$75 million annually more than is in sight through present sources of revenue.

If this type of highly organized effort is as successful in Michigan as it was in California, we are betting on a successful outcome. Also, on the outcome of engineering reports of this character that will eventually be made in other states.

The facts of highway need are so dramatic and overwhelming when properly analyzed and made public that no legislature can ignore them. When these facts are not properly presented, however, the result is a familiar story. Nothing much is done.



## Special Safety Rules Set Up for

# Highway Tunnel

**L. G. Defelice & Son, Inc., of North Haven, Conn., and Gull Contracting Co. of New York City, beginning Wilbur Cross Parkway project**

A TWIN-BORE 4-lane 1200-ft. highway tunnel through West Rock at New Haven, Connecticut, was awarded by the highway department during January. The bid by the above-named contractor combine was \$1,934,203.

The tunnel, first of its kind in the state's history, will be completed in 1949, according to Highway Commissioner G. Albert Hill. ROADS AND STREETS will describe construction methods at a later date, but meantime there is special interest in the plans for protecting the life and health of workers.

Consistent with the increased hazards involved in building a dual-lane highway under a mountain of rock, increased safety precautions will be required of the contractor. A prerequisite will be observance of applicable laws, and building and construction codes. In addition, highway department special provisions require that the contractor shall exercise precaution at all times for the protection of persons (including contractor and state employees) and property. Machinery and equipment must be guarded and all hazards are to be eliminated in accordance with the lat-

est safety provisions of the Manual of Accident Prevention in Construction, a publication of the Associated General Contractors of America, Inc.

### To Watch Scaling

The contractors will also be required to maintain a system of frequent inspection as the work progresses, giving special regard to rock scaling in all portions of the tunnel in which the roof is unsupported or unlined. It is also provided that he shall constantly employ during the life of the contract a properly qualified man whose sole duties shall be to initiate measures for the prevention of accidents, ascertain that all safety rules and regulations are enforced, and prepare reports on accidents as required.

The twin-bores and the east portal are located entirely within West Rock Park, a part of it being under the Baldwin Parkway. Plans call for a concrete-lined twin-bore tunnel with granite-faced, concrete-masonry portals. The center-lines of the two bores are parallel and 63 ft. apart. Each bore will have a clear width of 28 ft. to accommodate a 23-ft. concrete roadway and two 2-ft.-6-in. concrete sidewalks. The roadways will be on a 3% grade.

About midway between portals, the bores will be connected by means of a short cross tunnel or gallery from which will issue a concrete-lined ventilating shaft. This shaft will contain the exhaust flues and ventilating machinery and will extend vertically about 200 ft. to the surface of West Rock Ridge.

### Physician Service

In addition to the responsibilities for safe prosecution of the work which the contractor must accept under the terms of the contract, he is also required to make provisions for medical services. These include the establishment of an emergency room or rooms having adequate medical and surgical equipment for first aid treatment of injuries. The contractor must also designate one or more approved, competent, licensed physicians who shall at all times be in readiness to supply medical and surgical services.

Such physician or physicians must be promptly available at all times during construction operations. He or they will be held responsible for the inspection of the emergency rooms and their equipment and shall have authority to order the proper maintenance thereof. The medical supervision, if required, shall include smallpox vaccination, inoculation against typhoid and physical and medical examination of applicants for employment by the contractor. Ambulance service to an established nearby hospital shall be available at all times.

# ROME *four Of four*



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# Triple-Deck Grade Separation

## Under Construction in Virginia

**Part of 4-lane bypass at Norfolk, Va., this structure involved difficult foundation and drainage problems**

**A**n unusual underpass-overpass, designed to carry three levels of highway traffic and the double-track main line of the Norfolk and Western Railway, is under construction in the traffic-congested seaside area near Norfolk, Virginia.

In April of last year the Virginia department of highways awarded a \$955,522 joint contract for the project to E. W. Grannis Co. of Fayetteville, N. C., and Lewis and Bowman of Norfolk. Engineering expenses will run the net cost of the project well above the million-dollar figure. When completed this year, the "triple-decker" will be the final link in a \$6,000,000 traffic control 4-lane bypass around the city of Norfolk.

The Norfolk bypass, U. S. Route 13, got its start in 1938 when the state constructed the initial section. It assumed military significance during the war years as thousands of shipyard workers and Naval personnel swarmed the Norfolk metropolitan area. Under federal defense access funds, the major part of the bypass was completed during the war. The 4-lane divided highway had a high traffic capacity. One full cloverleaf interchange, a semi-cloverleaf, and traffic circle designs have alleviated most intersection difficulties.

### Problem and Solution

One uncompleted 0.37-mile gap remained in the bypass. In this small area US 460, state 166Y, and the N&W main line crossed the bypass route at grade, and Rte. 13 was nothing more than an outmoded 2-lane roadway. Virginia traffic and planning

officials estimated that more than 15,000 vehicles passed this area daily. Completion of the bypass by elimination of these hazardous intersections became Virginia's "highway project No. 1." The three-level design was evolved as the answer.

Rte. 13 (the bypass) will move across the top level of the structure, with Rte. 166Y on the lower level. Sandwiched between will be the N&W rail tracks and the eastbound lane of Rte. 460. The westbound lane of Rte. 460 merges with Rte. 166Y to pass below. An elaborate system of interchange roads will connect these routes.

### Design Data

The top level consists of four concrete beam spans, varying between 45 and 55 ft. in length, plus two 9-ft. pier sections. There are two 24-ft. concrete traffic lanes separated by a 6-ft. mall. Total length of the overhead bridge is 271 ft.

The intermediate level consists of a steel girder and beam bridge carrying the two rail tracks and one 24-ft. traffic lane.

The lower level is a depressed 46-ft. roadway with two sidewalks. For a distance of 565 ft. it consists of reinforced concrete supported on timber

piling. Since this level reached a low point 4 ft. below mean sea level, it was necessary to provide a complete system of drainage, including a permanent automatic pumping plant. A sump basin beneath the lower-level underpass insures proper drainage. Catch basins on both sides provide for entrance of surface water. Two electric, automatically operated, 4,000-gal. pumps carry the water to a surface drainage ditch.

### Preliminary Work

Before construction could be started, temporary highway and railway relocation was necessary. The 2,250 lin. ft. of main line double track was carried on a 15,000-cu. yd. earth fill. In addition, a 20-ft. highway detour was built.

With the lower level well below sea level, the de-watering of the entire 360 x 120-ft. area was one of the first tasks. This was accomplished by 200 wellpoints, 900 ft. of header, and two 8-in. pumps.

A 1-yd. dragline, at all times able to load dump trucks on the surface, excavated to a maximum depth of 16 ft. below sea level. The excavated soil was composed of layers and lenses of clay and varying sizes of sand. Sand, used to fill each wellpoint hole, passed through the various types of material and served to conduct the water to the wellpoints.

### Earthwork and Piling

A 16-acre borrow pit,  $\frac{1}{2}$  mile from

Virginia Dept. of Highways

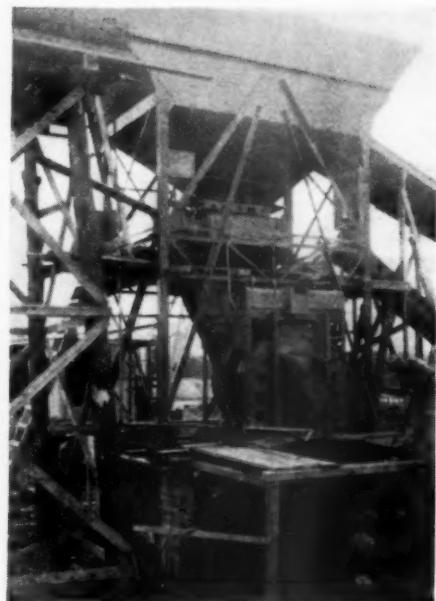
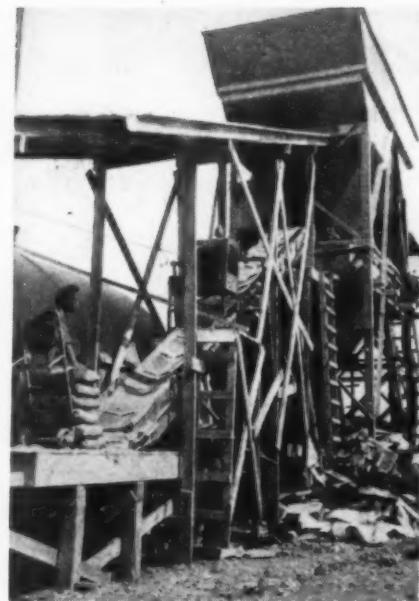


★ Virginia highway department artist's conception of the completed grade separation. Route 13 (Norfolk by-pass) crosses at top level, with routes 460 and 166Y passing beneath the N&W railroad tracks

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★ (Left): Two 8-in. pumps and 200 wellpoints were required to dewater the extensive below sea-level areas. (Center): Cement bags, stored in the Quonset hut shown at the left, are fed to the batcher floor by the belt conveyor. The bags are easily emptied when discharged over a splitting blade (Right): A better view of the batcher plant, showing three-compartment aggregate bins which feed downward into a stationary mixer. Pumpcrete pipe discharge is shown at lower right

the site, provided the approach material. Borrow excavation was carried to sea level by pumping the pit. Principal excavating equipment included dump wagons and a 16-yd. Euclid loaded by a 3-yd. Lorain dragline. This equipment was supplemented by three Caterpillar D8 bulldozers and a Caterpillar patrol grader.

Some 1,700 timber piles, penetrating 35 to 40 ft., were used to support the lower level. Treated piles were used only where the cut-off was above sea level. A total of 450 treated piles and 1,250 untreated piles were placed. All piles were peeled yellow pine having a 14-in. minimum butt and an 8½-in. tip. The sandy subgrade necessitated

jetting of all piles. The water for this operation was supplied by the well-point pump.

#### Batch Plant—Pumpcrete

Structural work still in progress is described as follows: Cement delivered in paper bags is stored in a Quonset hut adjacent to the mixer. The bagged cement is fed to the batcher floor by a belt conveyor. The conveyor discharges the bags over a blade which splits them, thus simplifying removal by the batcher operator.

Aggregate is delivered by barge to a dock less than a mile from the site. A crawler crane with clamshell un-

loads the barge, and the material is transported to storage stockpiles at the mixer plant.

A set of 75-ton three-compartment aggregate bins with batchers is charged by a 1-yd. crane with clamshell. These bins feed vertically downward into a 1-yd. stationary mixer which discharges into a size 160 Pumpcrete unit.

The discharge line from the Pumpcrete passes through an 18-in. culvert extending for 75 ft. under the railway tracks and thence to any part of the structure where concrete may be required. A 20-ft. length of 6-in. hose on the end of the Pumpcrete discharge adds flexibility in placing the concrete.

Kerosene burners this past winter provided the necessary heat for the concrete and mixing water, and a gasoline blower was used at the forms in extremely cold weather. The plant has a capacity of 20 yd. of concrete per hour.

The finishing of roadway slab surfaces was accomplished by a trussed aluminum alloy screen suitable for spans up to 60 ft. in length and adjustable to verticle curves.

#### Additional Work Required

The nearby rail line will expedite the delivery of structural steel. A spur will bring the steel directly to the job site, where it will be unloaded and erected with crawler cranes. After this operation, the railroad will be located in its permanent position between the upper and lower levels of



★ A Pumpcrete unit carried concrete from the stationary mixer to the forms. Here, with the help of 6-in. flexible hose, the workmen are placing concrete for the underpass slab

the three-way structure. Then the low-level underpass will be completed and vehicular traffic will move on this level. Current progress reports indicate that the underpass will be opened sometime this summer.

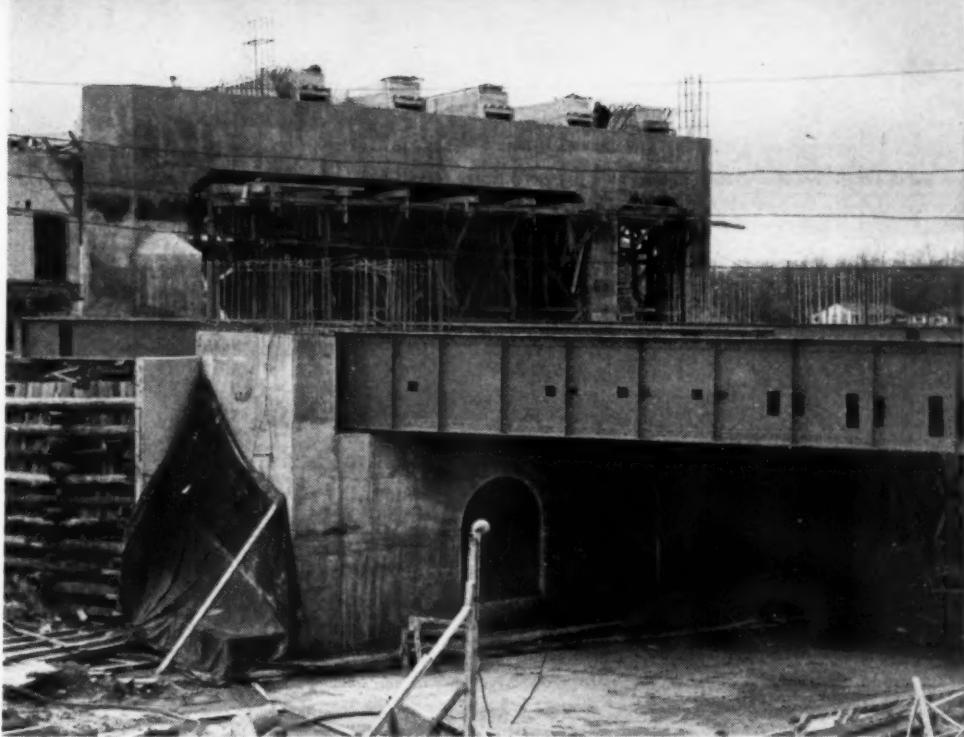
### Large Quantities

Quantities going into the project are large. For the structure itself the quantities include 6,532 c. y. of class "A" concrete, 921,237 lb. of reinforcing steel, 441,025 lb. of structural steel, 20,406 c. y. of excavation, 19,665 lin. ft. of treated piling and 55,235 lin. ft. of untreated piling.

For the roadway approaches, quantities include 30,202 sq. yd. of reinforced concrete pavement, 5,068 c. y. of regular excavation, 276,410 c. y. of borrow excavation, 1,000 lin. ft. of pipe and 1,000 lin. ft. of curb and gutter. Landscaping will be extended over 12.4 acres when beautification begins.

### Acknowledgments

Personnel on the project included R. M. Walton, supervisor on approach and paving work for E. W. Gannis Co.; Daniel Bowman, in charge of all structural work for Lewis and Bowman Co.; Boney Construction Co. of Norfolk, the pile-driving subcontractor; and Mechanical Engineering Corp., also of Norfolk, the electrical subcontractor. E. D. Hubbard is the highway department's resident engineer in the Norfolk area and exercises general supervision along with J. M. Hagan, district engineer for the department at Suffolk. H. E. Piercy is the project engineer.



★ This picture, taken in March, shows the west abutment, the Route 460 lower level and the plate girder center level over which the railroad will pass

**Traffic Engineering Fellowships—**  
Ten fellowships in traffic engineering for academic year 1948-1949 are available at Yale University. Fellowships amount to \$1,400 each, and applicants should have practical experience in city engineering, highway engineering, or in related fields. Information may be obtained from Bureau of Highway Traffic, Yale University, Strathcona Hall, New Haven 11, Conn.



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WHILST I AM PEGGING YOU HOT RIVETS."

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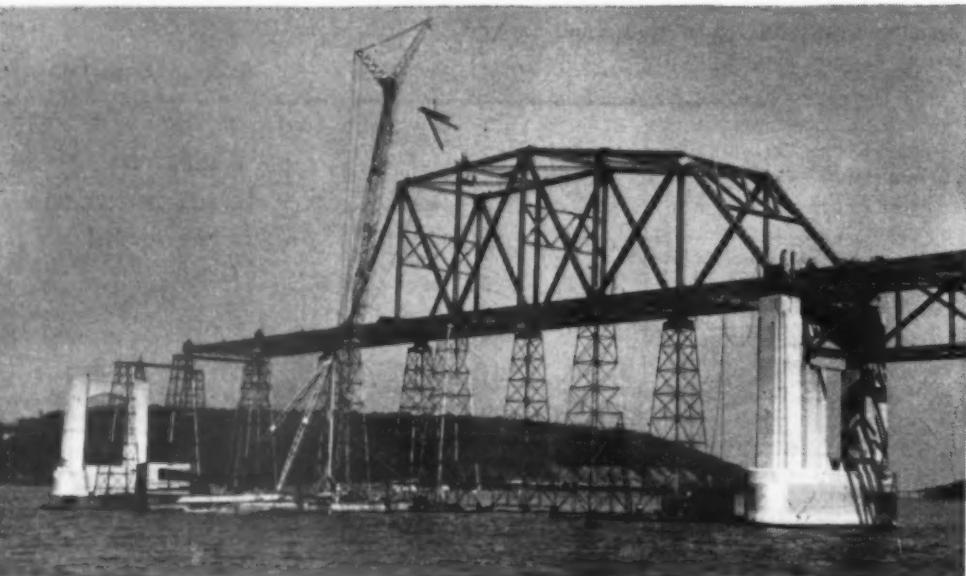
# Steel Set



★ Stiff-leg derrick erecting 36 WF steel beams at east end of bridge. Later, two additional pontoons were added under the derrick to furnish greater stability



★ Derrick erecting three top laterals of through truss. Bolted steel towers were fabricated on land, moved by barge in a vertical position and placed by derrick. Note that they occur at alternate panel points



★ Derrick erecting deck truss steel. Note pile-supported timber falsework at each panel point



# with "Sea Mule" and Pontoon

How 5,000 tons of structural steel was transported and placed for Harvard Street crossing at Peoria

By H. M. Maxwell  
Field Editor, Roads and Streets

STEEL was set largely from the water in erecting the new Harvard Street highway bridge at Peoria. This 4,745-ft. bridge, which crosses the impounded Illinois River, is nearing completion after a 5-year wartime interruption of superstructure work.

The bridge comprises twenty-eight spans, summarized as follows:

(A). At mid-stream, a 3-span continuous through truss unit 469-536-469 ft. individual span lengths, the middle span meeting navigation clearance requirements (spans Nos. 12-13-14).

(B). Three 3-span continuous deck truss units—two units approximately 208-260-208 ft. and one unit 156-208-156 ft. (spans Nos. 6-7-8, 9-10-11 and 15-16-17, respectively).

(C). Two 3-span continuous plate girder units each 86-110-86 ft. (spans Nos. 18-19-20 and 21-22-23) and a 2-span unit of similar size.

(D). Approaches comprising 3-span and single-span I-beam units as shown on the accompanying profile.

Roadway width is 26 ft. and there are two 2½-ft. safety walks. Profile of the bridge is governed by the 66-ft. clearance requirement for the navigation channel.

## Long Barge Haul

This project dates from 1941 on the

American Bridge Company's books, fabrication having just started when war shut the job down. The substructure was completed by Great Lakes Dredge and Dock Company in 1942, under a separate contract. Steel fabrication was resumed early in 1946, first steel, for the west approach arriving September 27. Trusses, plate girders and beams for spans Nos. 18 to 30 were shipped in two barges from Pittsburgh making the trip down the Ohio and up the Mississippi and Illinois rivers in a month's time. Other steel came from Gary, Indiana, by rail. Parts of spans Nos. 9-10-11 and 15-16-17 also came by barge.

Clinton Bridge Works, of Clinton, Ia., Division of Allied Structural Steel Companies, the erection contractor, unloaded steel from barges and cars with a 1½-yd. crane (Koehring) which handled members weighing up to 16 tons. The Clinton firm used two hauling methods. For example, two A-frame trucks, back-to-back, moved the 8½-ton batterchords of span No. 14. A 2-ton truck with pole trailed hauled the 9-ton chords for this span.

Actual erection was started October 7, 1946. In two fall months before winter stoppage, all 16-girder and beam spans were erected. Two riveting crews, sometimes three, were kept busy.

A 1½-yd. crane with 90-ft. boom and 20-ft. jib had no difficulty in erect-

ing the first five spans (spans Nos. 3A to 7) at the west end.

## Floating Equipment

Because of high water, the decision was made to erect the remainder of bridge from the water. Suitable equipment was the chief problem. Essentials included derrick for truss members, suitable barges, and an inexpensive means for moving derrick and heavily loaded barges from place to place.

A stiff-leg with 150-ft. boom was used to set all deck trusses and east-end girders. The addition of a 20-ft. jib enabled it to place the highest members of the through trusses.

Steel pontoons, some Navy surplus, some contractor-built, supported the derrick and its steam hoist. Made of ¼-in. steel plate 10' x 20' x 4' in size, the pontoons were capable of supporting about 24 tons. The accompanying derrick float sketch shows how the contractor arranged 13 pontoons to form a buoyant, non-capsizable support for the stiff-leg derrick. Flanges of adjacent pontoons were bolted together. It was, of course, important that the derrick float remain stationary while lifting operations were going on. Four simple anchors were used (again see float sketch). At each of these locations a short section of 14WF (H-beam), with web horizontal, was welded to the side of a pontoon. A square hole was burned through the web. Through this hole slides the anchor, a 25-ft. long 12WF. When the derrick float was in the desired loca-

★ Looking southeast at through truss spans. The middle span will be erected this spring. The little boat in the center foreground is the sturdy Chrysler "Sea Mule." The canvas is not to keep the sun out. It's a cold day in late November





★ Contractors' two methods of hauling heavy truss members—left, Koehring crawler crane loading chords (9 tons each) on 2-ton truck and pole trailer; right, two A-frame trucks hauling 8½-ton batter chord

tion, each of the four anchors was dropped till it penetrated the river bottom. Before the rig was moved to a new location, the anchors were raised by the derrick and held in a raised position by steel pins inserted in holes drilled in the anchor webs.

#### The "Sea-Mule"

During the 1946 season the Clinton Bridge Works used a Navy surplus LST for all water-hauling work. This last year, however, two war surplus Chrysler "Sea-Mules" were substituted, one being kept only as a standby. These sawed-off half-boats have gaso-

line motors and 48-in propellers which can be adjusted for depth. They are powerful and surprisingly mobile. In addition to pulling heavily-loaded barges, a "mule" unit required only five minutes to move the large derrick float from one side of the bridge to the other.

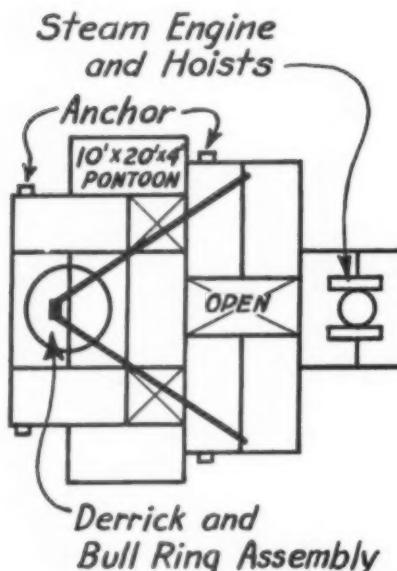
Two 20' x 50' barges, each built from five 10' x 20' x 4' steel pontoons, carried heavy loads of steel from the dock to the stiff-leg derrick. Three boiler pipe rafts supported compressors and miscellaneous equipment.

prior to riveting bottom chords. The state engineering staff is employing proving rings to test end reactions by actually weighing the ends of each 3-span truss unit, after riveting is complete. First each end is weighed in proper position. Then both ends are raised about  $\frac{3}{4}$  in. and weighed. Next one side is raised  $\frac{1}{2}$  in. more than the other and weighed. Finally, one end is weighed with the first intermediate roller pier jacked up about one inch.

#### Through Trusses Required Erection Towers

The through truss unit spans Nos. 12-13-14 cross the river channel at its deepest point. When winter weather stopped construction Dec. 17, 1947, erection of flanking spans No. 12 and No. 14 was complete. These two spans were by far the most difficult erection job. Some of the chord members weighed as much as 16 tons and had to be lifted high above water level. The stiff-leg with jib added was able to erect all members. Both 35-ton and 100-ton hydraulic jacks were used to swing the spans.

Since spans Nos. 12 and 14 were not self-supporting until all members were riveted in place, pile-supported steel towers were located under every other panel point of each truss to offer



★ How contractor arranged thirteen 10' x 20' x 4' steel pontoons to form a noncapsizable support for the stiff-leg derrick and steam hoist assemblies. Each of the four anchors is a 25-ft. long 12WF H-beam section guided by a slot cut in a 14WF welded to the edge of a pontoon.

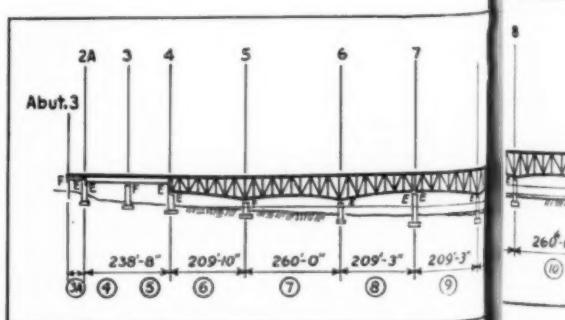
#### Girder and Beam Erection

Erection of the single-span beams at each end of the bridge (spans Nos. 3A and 30) was a simple task. All other beams and girders, however, were continuous with field splices occurring between piers. Because of water at the east end of the bridge and busy railroad tracks at the west end, timber falsework could be used under field splices only at span No. 5. The 2-span girder unit involving span No. 5 was completed by cantilevering.

Girder spans Nos. 18 to 23 and beam spans Nos. 24 to 29, each composed of 3-span continuous members, required no falsework—erection being carried from the east to the west end of each continuous member by cantilevering field units.

#### Deck Truss Erection

When erection work was resumed May 5, 1947, the contractor first erected deck truss spans Nos. 6-7-8, 9-10-11 and 17-18-19. All deck trusses were supported during erection by timber falsework. Three piles were driven under each panel point, each outside pile being in line with the lower chords. The contractor used 35-ton hydraulic jacks to swing the spans and to obtain proper camber





★ Girders were erected from water and land—(left): derrick erecting girders from barge at east end. (Right): crawler crane erecting 7-ft.-deep plate girders near west end of bridge. Far girder was erected first on pier and falsework. The near section will rest on adjacent pier and be riveted to the far section. A third section will extend to the pier in the left foreground

temporary support.

The fabrication and erection of these towers were no small jobs in themselves. Each tower was supported on eight piles. One straight and one battered pile were driven at each corner. The straight piles were driven in a square pattern about  $14\frac{1}{2}$  ft. on a side. A steel plate was pinned to the two piles at each corner and bolted to the tower base. The 57-ft. high steel towers were fabricated with steel angles. The base is of the same dimensions as the pile group— $14\frac{1}{2}$  ft. square. The tower tapered to a 6' x 7' top. Two I-beams at the top supported wood blocks used for jacking panel points to proper elevation. Each tower was assembled by bolting on land, placed by the derrick on a barge in a vertical position, pushed to the proper location by the "Sea Mule," and erected on the piles by the derrick.

The temporary support towers were left in place until the flanking truss riveting was complete. Piles were pulled by the derrick.

#### Remaining Steel Erection

The 536-ft. through truss span No.

13 will be set this spring, using the cantilever method. The two flanking spans were purposely set 7 in. low at their far ends to take up the center truss cantilever sag. As before, all truss members will be erected from the water by the stiff-leg derrick. Working from one end erectors will at no time be more than two panels ahead of the riveters.

Concrete deck and sidewalks will be built under contract awarded to the M. J. McDermott Co. of Chicago.

The superstructure comprises 6,766,670 lb. of carbon steel and 3,194,570 lb. of silicon steel. Cast steel in rollers and bolsters total 91,950 lb. There will be 3,976 sq. ft. of open grid floor.

Contract prices have included \$619,088 for the substructure, \$708,076 for superstructure fabrication, \$362,864 for erection, and \$377,381 for the deck. Financing is by Illinois and Federal highway funds.

#### Contractors and Personnel

Harvard St. Bridge is an Illinois division of highways project, of which W. W. Polk is chief highway engineer

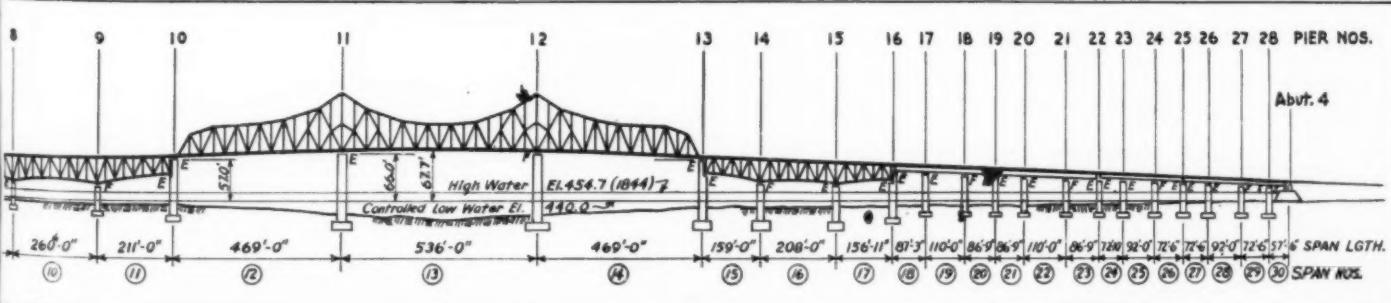
and J. D. Mattison district engineer. A. C. Tosetti is resident engineer. The superstructure erection is being supervised by S. N. Beasley, superintendent for the Clinton Bridge Works.

#### Handy Tables

A new publication, designed to simplify the computation of vertical curve externals was released December 8, 1947, by a former ROADS AND STREETS contributor. The "E-Z-V-C Tables for the Computation of Vertical Curve Externals" is written by a highway designer, but is applicable to all routes where vertical curves are desirable. The range of vertical curves covered by this publication is from 10 to 2,000 ft. Corrections may be figured for any point on the vertical curves, as desired. The accuracy obtained is theoretically exact, to within one hundredth of a foot.

Col. Shults, the author of these tables, may be remembered as the originator of the method for "Designing Two-Soil Mixtures." (R & S June '47).

★ Harvard St. Bridge, Peoria, Illinois. Letter "E" adjacent to a pier indicates expansion roller support, "F" fixed support





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## Carl Franks to Head PCA Promotion

Election of Carl D. Franks as vice president for promotion, Portland Cement Association, is announced by president Frank T. Sheets. In this new responsibility Mr. Franks, under the direction of the president, will be in charge of the Association's promotive activities throughout the country.



Mr. Franks has been a member of the Association's staff since 1916 when he became District Engineer in charge of the Indianapolis Office. In 1924 he was made Midwestern Regional Manager and has been in charge of the work of seven district offices covering field promotion in 10 states. Mr. Franks is a 1911 B.S. in C.E. graduate of Purdue.

**AGC Establishes Research Department**—A Department of Research has been created in the National Office of the Associated General Contractors of America. Harry J. Kirk, heretofore manager of the Contractors Division, is manager of the new department, principal purposes of which will be to study and correlate information on contract documents and specifications; uses and cost of owning construction equipment; and construction statistics.

**Western Society of Engineers To Move**—The Western Society of Engineers, for many years located at 205 West Wacker Drive, Chicago, Ill., on May 1 will move to its new headquarters at 84 East Randolph St., Chicago, Ill. This 79-year-old organization has taken the lead in establishing an engineering and scientific center in Chicago. Other organizations of similar interests and professional standards will be invited to share in the expanded headquarters.

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## Arguments Over

# Cost Plus Items

## Can Be Avoided

**Explicit specifications and statement of conditions can largely eliminate arguments and ill will such as often have resulted from loosely drawn contracts**

**By E. T. Nettleton**

Associate Highway Engineer  
State Highway Department of  
Connecticut

MISUNDERSTANDING of cost plus items in construction contracts produces more arguments and causes more ill-feeling between the owner, the engineer and the contractor than do all other factors added together. Nevertheless, we always have had and we shall probably continue to have cost plus items. It is not economically possible for the owner, the engineer, or the contractor to foresee all contingencies which may arise in construction work.

Most specifications require that extra work necessary to the satisfactory completion of the project shall be performed by the contractor. This stipulation is very logical. Should another contractor be brought in to the same location at the same time, there would doubtless be friction. These same specifications state that, when this extra work does not fall within the scope of the original contract, payment shall be made on a cost plus basis, unless otherwise agreed.

A decade ago, most contractors looked upon cost plus items with considerable glee. Taking advantage of loose specifications, many contractors padded their charges for cost plus work, much to the embarrassment of the engineer and to the financial distress of the owner. In many cases, when competition was keen, a contractor would bid on a project at cost; in so doing, the contractor was cognizant that an adequate profit for the entire job could be realized in the cost plus items alone.

### More Strict Today

Today, when competent engineers or architects are employed, this condition does not hold true. In fact, the pendulum often swings to the other

extreme. These officials tie down the specifications so arbitrarily, interpret them so rigidly, and scrutinize the contractor's claims so thoroughly that most contractors wish there were no such things as extra work paid for on a cost plus basis.

The first reaction to a cost plus item in the mind of many contractors is the expense involved in considering all factors involved including delays in other operations. His second reaction is consideration of the profit which can be claimed under the specifications, including direct and indirect costs. He may even endeavor to include costs rightfully attributed to other items.

The first reaction in the mind of the engineer, or owner, is the smallest amount of money necessary to get this work done. His second reaction is the best way to interpret the contract specifications in order to exclude all the indirect costs.

At this point, there exists a perfect condition for arguments. The contractor, striving to get as much for the work as possible, and the engineer striving to get the work done with as little cost as possible. Arguments may come fast and furious. This situation brings on a feeling of ill will. In turn, ill will is a major cause which tends to bias the fair judgment of all parties concerned. When to this unpleasant condition we introduce indefinite and vague specifications pertaining to cost plus work, a fair and reasonable interpretation or ruling is difficult to obtain. Oftentimes the outcome results in a case being presented to the courts. Regardless of the verdict, court cases, like wars, produce no winners; direct and indirect costs in time, money, future ill will, and loss of prestige are the results.

### Clear Specifications Needed

In conclusion, it may be said that the best way to stop a fight, or an ar-

gument, is not to invite the possibilities in the first place. Indefinite specifications, or agreements, constitute a definite invitation for an argument; therefore, specifications, or agreements, concerning cost plus work should be written definitely and should be clearly understood by all parties before any extra work paid for at cost plus is started. The principal object to consider in any cost plus agreement is a practical, fair, and understandable method of arriving at an equitable cost which does not penalize any of the parties concerned. This brings the problem down to a clearly written statement. It should include the following: a clear statement of conditions showing when cost plus items apply; an adequate description of the cost factors to be included under these items; and a positive definite statement of the method of computing payment for these items, so that there can be no reasonable room for argument in the interpretation of the description. A typical cost plus agreement is herein listed followed by an explanation of each item. Before applying this general form to any particular project, the reader should make such revisions as the varying local, natural, or legal conditions might warrant.

### Descriptive Statement of Each Sub-Division Under Cost Plus Agreement

#### E-1 Rental of Equipment:

Allowance for equipment rental as shown by certified payrolls. Allowance to be in accordance with an agreed schedule (herewith attached schedule dated.....) Associated General Contractors' schedule dated..... Associated Equipment Distributor's schedule dated.....) The adopted schedule must specify whether

## Cost Plus Agreement

Job: .....  
Location: .....

Conditions under which extra-work will be paid for at cost plus:  
(a) The satisfactory completion of the project necessitating other types or items of work not originally called for in the specifications, special provisions, or plans.

(b) Changes in quantities of major items in a unit price bid exceeding ..... %.

(c) Additional quantities of any item in lump sum bids.

Description of the cost plus items included in this agreement:

- (a) .....
- (b) .....
- (c) .....
- (d) .....

### Basis for Payment:

Payments for cost plus items will only be allowed on the following agreed basis and in accordance with descriptive statement of each sub-division herewith attached:

### Payment for Equipment:

E-1 Rental of equipment.....	100%
E-2 Transportation, loading and unloading of equipment .....	100%
E-3 Charges for permits and insurance, if required.....	100%
E-4 Charges for fuel, grease and operating.....	100%
E-5 Profit on items E-2, E-3 and E-4 .....	10%

### Payments for Labor:

L-1 Total of all straight

Witness.....

Witness.....

Date.....

time payments .....	100%
L-2 Total of all overtime payments .....	100%
L-3 Total of all other payments or allowances.....	100%
L-4 Charge for use of small tools—add items L-1, L-2, L-3.....	1%
L-5 Workmen's Compensation—add items L-1, L-2, L-3 .....	%
L-6 Public Liability—add items L-1, L-2, L-3.....	%
L-7 Property Damage—add item L-1, L-2, L-3.....	%
L-8 Old Age and Social Security—add items L-1, L-2, L-3.....	%
L-9 Extra Insurance Coverage if required—add items L-1- L-2, L-3.....	%
L-10 Bond, if required—add items L-1, L-2, L-3.....	3%
L-11 Administrative Expense—add items L-1, L-2, L-3 .....	%
L-12 Profit—add items L-1, L-2, L-3.....	15%

### Payment for Materials:

M-1 Cost of material F.O.B. shipping point.....	100%*
M-2 Transportation Costs.....	100%
M-3 Unloading and hauling costs .....	100%
M-4 Sales Tax Payments.....	100%
M-5 Insurance Payments, if required .....	100%
M-6 Profit—add items M-1, M-2, M-3, M-4.....	10%

(\*If discounts are allowed, state who gets the advantage, the owner....., or the contractor.....)

Agreed to by.....  
(Company)

(Officer and Title)

Accepted by.....  
(Company)

(Officer and Title)

tors' wages in this case are paid for under L-1, L-2 and L-3.)

E-5—Percentage for profit taken on total of E-2, E-3, and E-4, as equitable allowance to contractor. No profit is allowed on E-1, as it is assumed that profit, depreciation, depletion, interest on investments, repairs, and upkeep, have been taken into consideration in arriving at the equipment rental schedule.

L-1—Actual cost of field labor as shown by certified payrolls in accordance with an agreed to schedule including the salaries of (a) foreman (b) mechanics, operators, and artisans of the skilled or semi-skilled classifications (c) laborers (d) job superintendent, timekeeper, professional engineer, watchman, waterboy and others only in proportion to time it can actually be proven that was consumed and was necessary to spend on the cost plus items.

L-2—The actual overtime cost (when such work is requested by the owner or when such work is required as an emergency) at rates as shown by certified payrolls which rates are established by the specifications, by law, by labor agreements, or by current established practices.

L-3—The actual payments made as shown by certified payrolls in accordance with labor requirements to meet guaranteed weekly wages, to meet guaranteed daily hours of work once work for the day is started, and to meet guaranteed daily hours of work for reporting to work and not being put to work.

L-4—Percentage on total of items L-1, L-2, and L-3 to take care of depreciation, and depletion on small tools.

L-5—Percentage on total of items L-1, L-2, and L-3 to take care of Workmen's Compensation. Check rate with bonding company for manual rates applying to the company, the type of operation and the locality.

L-6—Percentage on total of items L-1, L-2, and L-3 to take care of public liability. Check rate as under L-5.

L-7—Percentage on total of items L-1, L-2, and L-3 to take care of property damage. Check rate as under L-5.

L-8—Percentage on total of items L-1, L-2 and L-3 to take care of old age and social security. Check rate with tax departments of state and federal government.

L-9—Percentage on total of items L-1, L-2 and L-3 to take care of extra insurance coverage, if such is required, to cover such items as fire, blast, collapse, windstorm, etc.

L-10—Percentage on total of items L-1, L-2 and L-3 to take care of bond if required. Bond is usually based at

loading and unloading the equipment to and from the job. This will only be allowed when the equipment is not on the job for other work.

E-3—Actual charges paid for permits and insurance in transportation, if required.

E-4—Actual charges for fuel, grease and operating supplies, if equipment is rented on a bare basis. (Opera-

tion is hired on a monthly, weekly or daily basis and what constitutes a month, week or day. The schedule must also stipulate upon what basis it is figured i.e., fully operated (rental, operator, fuel and service), partially operated (rental plus 1 or 2 of the other items) or bare (rental only).

E-2—Actual cost of transportation,

1% of total cost. Assume direct labor costs roughly 33½% of total cost. Therefore, if bond is charged for convenience only against labor a rate of 3% should be used.

L-11—Percentage on total of items L-1, L-2, and L-3 to take care of administration. This allowance would include indirect intangible time and expense of executives, general superintendents, timekeepers, watchmen, master mechanics, etc. Also included would be expenses for clerical work, stenographic work, telephone and telegraph charges.

L-12—Percentage on total of items L-1, L-2, and L-3 to be allowed to the contractor as profit.

M-1—The actual cost of materials F.O.B. shipping point as shown by actual bills. State whether discount for prompt payments accrue to advantage of the owner or the contractor.

M-2—The actual costs of transportation as shown by actual published rates or bills of lading. Discounts for prompt payment not to be deducted by the owner but allowed to the contractor. Assessments or charges for demurrage not to be allowed to the contractor by the owner.

M-3—The actual costs of unloading and hauling as shown by sub-contractors billing.

M-4—The actual charges paid in the form of sales taxes.

M-5—The actual charges paid for insurance if required.

M-6—Percentage on total of items M-1, M-2, M-3, M-4 as an allowance for profit to the contractor.

*(Any opinions expressed in this article are those of the author, and do not necessarily reflect the views of the State Highway Department of Connecticut, or of this publication. This article may not be reprinted without the permission of the author.—ED.)*

Creation of additional off-street parking facilities in Boston is under consideration by the Massachusetts legislature. Also awaiting action are measures to regulate parking lots and garages within the state and to give municipalities, when dealing with snow or ice emergencies, power to further restrict parking and remove vehicles where necessary. Another proposal provides for increases in fines for parking violations.

Alleviation of parking difficulties in the New York cities of Syracuse, Binghamton and Elmira is sought by a recently enacted law permitting creation of parking authorities in those cities. Utilization of park land in Albany for off-street parking is authorized by a new law setting aside designated areas for such parking facilities. The White Plains Parking Authority Act has been amended, to remove the prohibition against the State building any other parking facility within the city of White Plains. Additional parking garages and bus terminals are contemplated in an extension of power of the Triborough Bridge and Tunnel Authority, with a permissible increase in bond issues from \$10 million to \$35 million under one of three measures which have passed both houses.

## Parking Legislation Pending In Five States

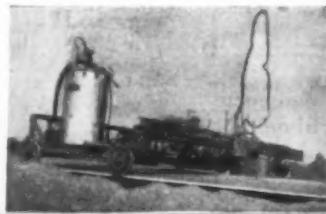
Wide legislative interest in the parking problem is evidenced by a variety of proposals now under consideration in several states, a study by the National Highway Users Conference shows.

New Jersey municipalities would be permitted to lease land and buildings for parking purposes by a bill in that state. Another bill would permit the State Highway Commission to acquire unimproved land abutting highway rights-of-way for parking strips.

## MECHANIZE BEHIND THE FINISHER

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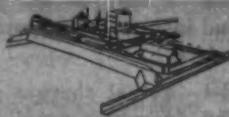
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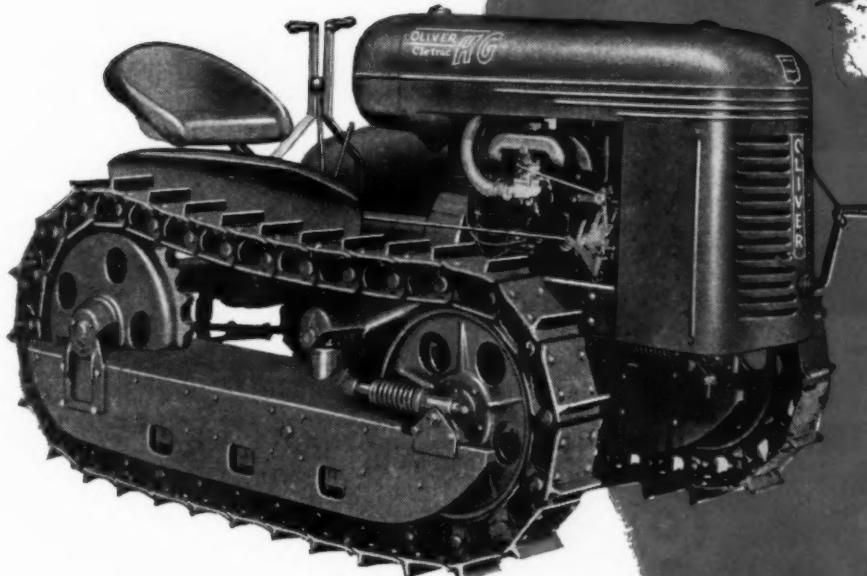
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Company \_\_\_\_\_

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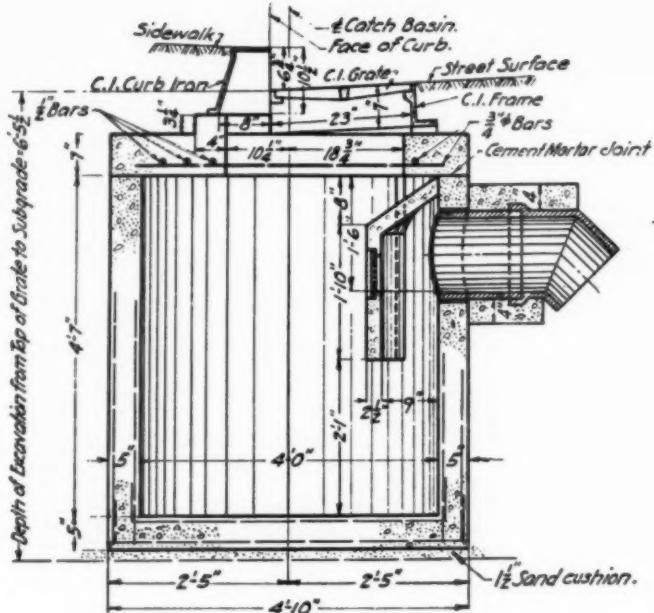
"THE SIGN OF  
EXTRA SERVICE"



# JOB and EQUIPMENT IDEAS

## Steeple Built First

When a Louisville, Kentucky, contractor was delayed in building the main part of a church, due to slow arrival of materials, he reversed the usual construction procedure by erecting the steeple first. A 40-ft. high steeple structure was fabricated and then hoisted and set at a level 85 ft. above the floor by means of an extra long crane boom and extension as shown here. Photo by "Press Association, Inc."



★ Design details of precast catchbasin, for single grate made by pipe manufacturer using forms for standard 4-ft.-diam. concrete pipe

## Precast Catchbasins Save City Funds

Use of precast concrete catchbasins, embodying a section of 4-ft. diam. standard concrete pipe, is literally halving the cost of street catchbasin installations in Louisville, Kentucky. According to W. W. Sanders, chief engineer, Louisville dept. of public works, the units are made up to city engineering department design in the yard of a local pipe manufacturer (Kentucky Concrete Pipe Co.). The catchbasin or manhole base is prepared—then the pipe company hauls the unit to the job and, if the location permits access by truck, lowers it in place with a truck-boom as part of the delivered price. Price currently is running about \$60 each including choice of 3 different types of precast concrete covers but not iron grating. The catchbasin design includes a built-in trap.

The contractor digs the hole and carries on from there. Delivered units arrive completely ready to receive outside connection. The trap is manufactured in place with a precast concrete disc to be removed when rodding of the catchbasin leads is necessary. It is reported that built-in-place catchbasins in this city would cost more than twice as much as the precast units thus installed.

Precast manholes are also employed frequently. These are cast in 5-ft. cones with 25-in. round opening at top and taper out to 48 in. outside

drain. At bottom of cone, manholes of any depth over 5 ft. are furnished in 48-in. drain pipe, with tongue and groove joint. These precast units have been approved by the Kentucky department of highways as well as the Louisville metropolitan sewer district.

### Portable Offices for Texas Field Staff

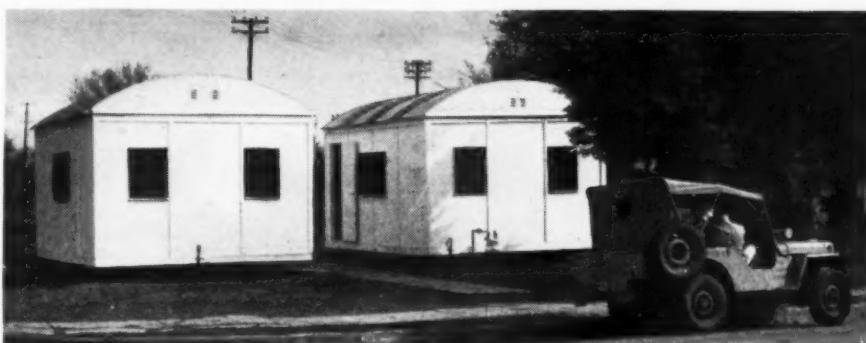
These two sheet metal huts were located along the route of Dallas' new Central Boulevard expressway project. At the time this photo was snapped (1947) they served as the field office for this extensive project. We make a point to pass this photo along to R and S readers, not only because well insulated and comfortable buildings of this type can often be purchased or built economically, but because they are easily moved and when properly located save a lot of time and trouble. In almost every urban expressway job we've seen, there's been the problem of housing the field office and survey party personnel. You see men stuck up on the fourth floors of walk-ups, in old houses inconveniently located, etc., or else the fellows just go and come from the permanent district office, which may be O.K. or it may not.

### Construction Mechanic Solves Housing Problem

This big 4-room house trailer was setting along the road as we passed



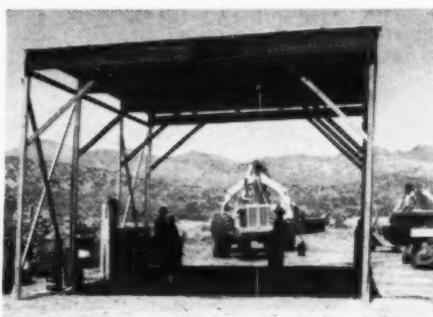
★ Type of truck equipment used by pipe maker to set units in place as part of delivered price



Carney Construction Co.'s US 70 job in Arizona last summer. According to superintendent Ray Richardson, it was occupied by the family of one of his mechanics who has thus worked out nicely the problem of how to live

from job to job in that part of the world.

Shown here also is Superintendent Richardson, well known in Arizona road work, and a glimpse of his knock-downable open-air shop.

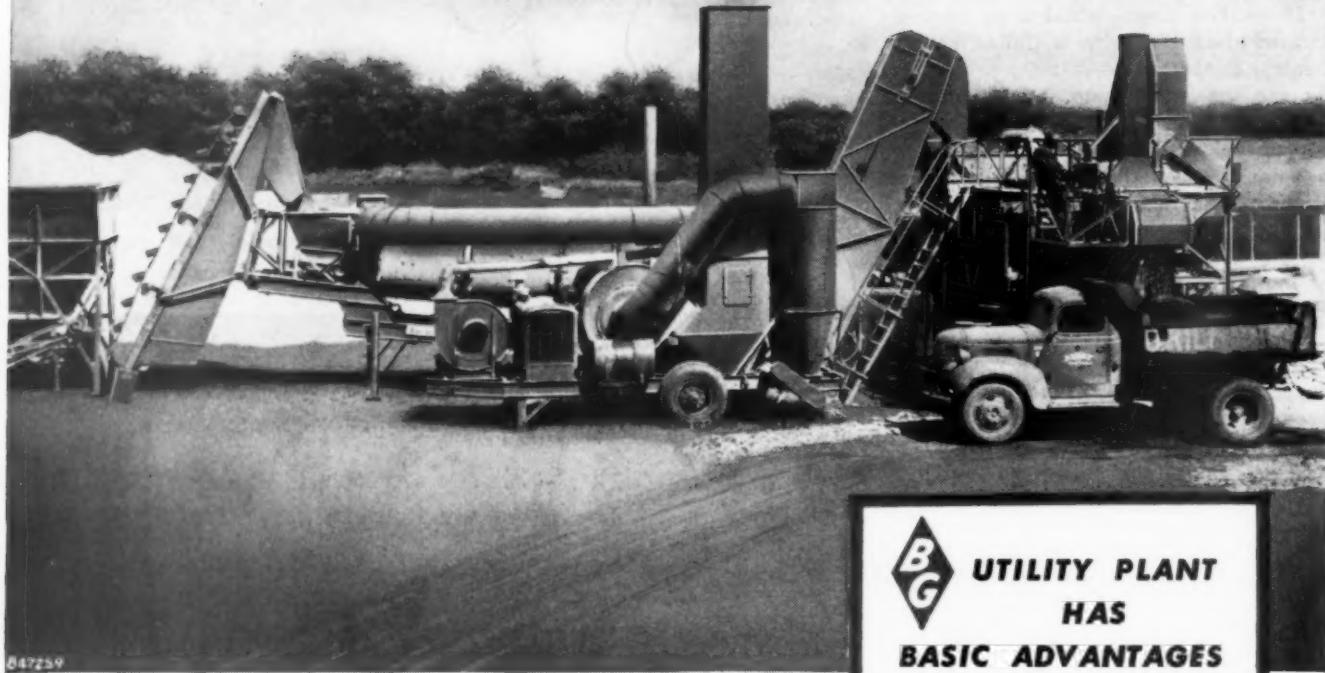


### New Snow Removal Plan for Massachusetts

The financial problem of snow removal, critical in several states due to the record winter, may be settled in Massachusetts by state reimbursement of municipalities for snow removal costs. The governor is expected to propose this plan to the legislature, now considering legislation to finance snow removal by increasing the gas tax one cent a gallon. The one-cent tax would bring in \$8,000,000 annually.

Average truck load on the highways today is 4.36 tons, or 37% higher than in 1941, this increase being accounted for largely by appearance of more and larger semi-trailer or combination-type trucking units, according to PRA figures.

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B Constant Flow  
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# Sod

## Its Production and Placement at the Sampson (N.Y.) Naval Training Station

By Dr. Jacob Feld

Consulting Engineer, New York, N. Y.

THE experience obtained in the production, harvesting, transportation and placing of almost 4,000,000 sq. ft. of sod in a 5-month period should be of use in the planning of sod cover on roadway separation malls, shoulders and roadside areas. This work, performed under pressure, in unfavorable weather with totally inexperienced labor and the poorest type of agricultural soils, is believed to be the largest sod producing and laying operation ever attempted in such a short time period.

### Extent of the Project

An area of 2500 acres, adjacent to the east shore of Lake Seneca, N. Y., was converted into a training station for Navy personnel in 1942. In each of six "boot" training areas, there was provided a rectangular drill field, 15 acres in size. Land was acquired June, 1942, before any surveys or plans had been executed. By the middle of July, it was decided that a sod cover would furnish the most rapid method of surfacing the drill fields. No such quantity of sod could be purchased from any available source at any reasonable cost. The nature of the local soil and the probable interference with construction operations forced the work of sod production to vacant sub-marginal land about 20 miles distant.

The first drill field was completed Sept. 28 and turned over for use to the Navy on Oct. 17. All fields, with the exception of a part of one, were completed by December 1, when continuous heavy frost closed down all surface operations.

### Sod Production

John R. Van Kleek's investigation of all phases of the sod program resulted in the discovery of some 200 acres of pasture land (owned by the Soil Conservation Service, U. S. Dept. of Agriculture) in the vicinity of

Hector, N. Y., about 20 miles south of the Station. The general terrain was rolling farm land which, because of depletion of fertility, had been abandoned and allowed to grow wild. This very stony ground is underlain by sedimentary rocks. Arrangements were made to permit the production of the necessary sod on condition that the areas stripped be re-planted to avoid erosion.

The pasture sod was found to consist chiefly of Canada Blue Grass mixed with a great variety of wind-blown seeded growth. Practically the entire area was first mowed so as to permit a closed inspection of the better areas. Tractor-drawn sickle bar mowers with self-dumping hay racks and loaders and light trucks started work mid-July. About 120 acres were then chosen for treatment and strengthening of the grass.

Since soil analysis showed a slightly alkaline condition no lime was needed. Four hundred pounds of 5-10-5 fertilizer per acre were distributed mechanically. Fertilizer was used sparingly to avoid over-stimulating the grass, since it was not desirable to have too tough a root structure when the sod was being cut.

Following Mr. Van Kleek's recommendation, based on the soil analysis of the drill fields, a seed mixture of 100 lb. per acre was then applied over the areas being fortified, this mixture containing:

30% each of Fescue and Kentucky Blue grass.  
10% each of Canada Blue Grass and Red Top.  
15% of Domestic Rye Grass.  
5% of Dutch White Clover.

After seeding was completed the area was worked over twice in opposite directions with a tractor-drawn double-row cultipacker. To reduce damage to the sod the tractor units were replaced with rubber-tired machines in soft areas and in areas worked immediately after a rain. Most areas were rolled with a 1200 lb. roller after the surface working. A grass height of 1½ in. was maintained by mowing continuously.

### Sod Cutting

Experimental sod cutting was begun Aug. 27, 1942. The large number of imbedded stones and the heavy clay sub-soil made necessary the reconstruction of the commercial type of strip cutters. The cutting edge was reinforced, and an extra man was required in addition to the man guiding the cutter. This man rode on the cutter to expedite removal of the larger stones and to provide weight as needed to cut at proper depth. The cutter was pulled by a tractor with rubber tires. The 2½-in. to 3½-in. thick strips were 12 in. wide and the full length of the field.

Strips were cut by hand into 2 ft. blocks. Block cutters were sharpened heart-shaped spades, with curved, extended handles which permitted the operator to stand erect while cutting through the sod. The mechanical sod discer which cuts strips into 1 ft. squares was not practical because of the ground conditions.

The sod was too heavy and too thick to allow for rolling before loading the trucks. A special method was devised to reduce both handling and transportation costs. Wood pallets or trays were made from the scrap at the building construction mill as detailed in Fig. 2. These were laid out in rows adjacent to the sod strips. Men working in pairs with pitchforks, transferred four blocks from the ground to each tray. This gave 8 sq. ft. of sod, about as much as two men could lift. Trucks were run on the stripped ground and the trays were loaded on the low body trucks. The operation was later reversed in unloading the trucks at the drill fields.

Sod production was actively begun on Sept. 5. Until that time an average of about 40 men was employed at the sod farm for six weeks. With the exception of six experienced landscape garden men and a supervisor who was trained and experienced in

this type of work, the men were unskilled labor, chiefly recruited from New York City. Most of them had never been in such open country and had difficulty in becoming acclimated to working 20 miles from the nearest town and almost that far from a telephone. By Sept. 28, the crew had increased to 212 men and the farm was sending out about 28 sq. ft. of sod per man-day. Work was carried out 10 hours per day and seven days per week, weather permitting. The peak of production was reached October 12, when 314 men at the farm shipped out 108,000 sq. ft. (34½ sq. ft. per man-day). These men took care of all operations at the farm—cutting, stripping, loading trucks, unloading returned trays, moving, re-seeding and also all overhead classifications of work such as tool storage and repair, time-keeping and supervision. During this period of high production three field areas, located rather far apart to avoid truck interference, were worked simultaneously.

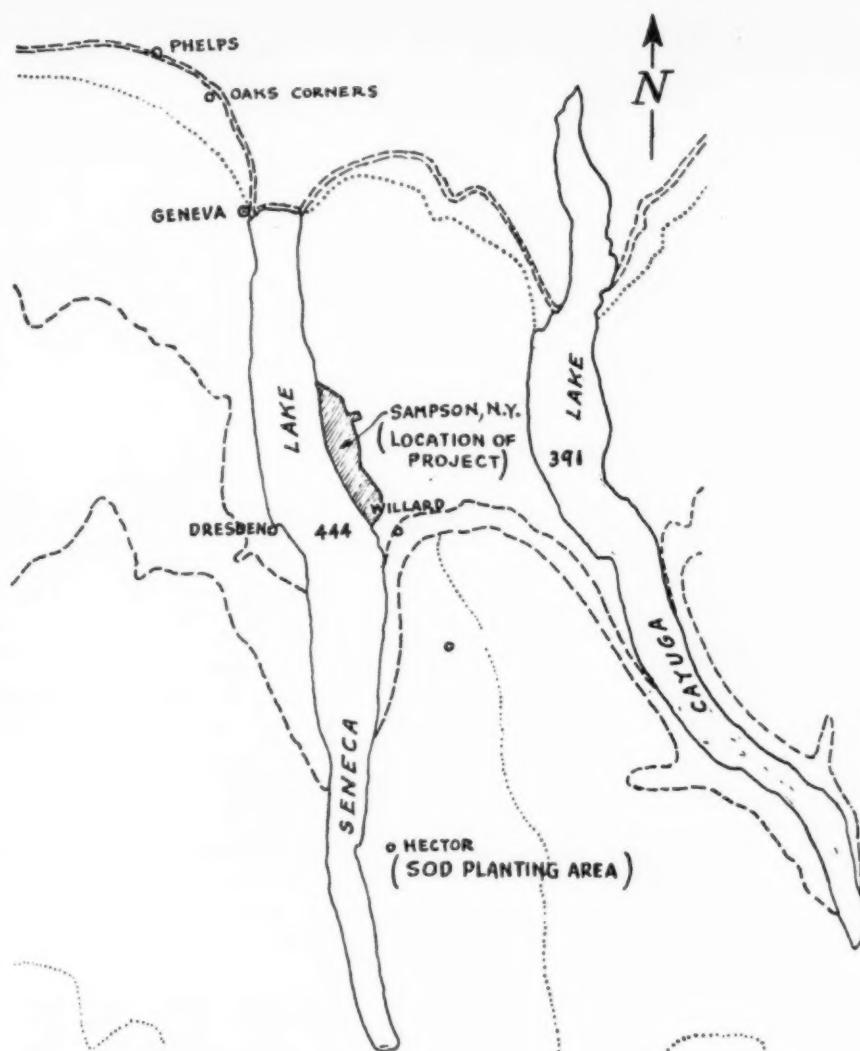
#### Erosion Protection

As soon as any areas had been stripped of sod, they were rehabilitated by spreading on each acre 1200 lb. of ground limestone, 250 lb. of 20% superphosphate and 50 lb. of pasture grass.

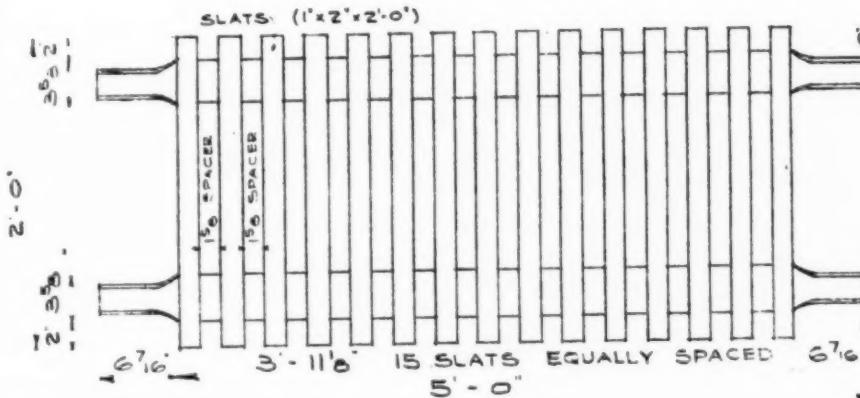
#### Trucking

Low body flat trucks hired on an hourly basis were scheduled to start at staggered hours at each sod-producing field being worked. The original plan was to use bodies 8 by 12 ft. and load them with 120 trays, making a total of 960 sq. ft. of sod. As it was soon found that no such load could be carried on the trucks running over natural ground where sod had been stripped, the truck load was fixed at 560 sq. ft. of sod or 75 trays. The trays were stacked on the truck in two lines, the handles being nested at the center line of the load. Trays stacked six high were found to be about the most economical loading for manual handling on and off the trucks. When the sod was very wet, the stack height was reduced to five and the truck load also reduced to 60 trays to compensate for the greater weight and to prevent damage to the lowest sod during transportation.

The loaded trucks measured about 9 ft., slightly more than the state highway legal width. However, most of the run was over little used farm roads where local custom in hay-moving permitted truck loads in excess of 8 ft. There was practically no loss of sod during transit. The only serious



★ Fig. 1. Location map



★ Fig. 2. Details of sod carrier

problem was the collection of empty trays which, on return trips, fell from the trucks at curves in the road.

The normal fleet numbered 50 so called 1½-ton flat body trucks. The maximum number was 70. All trucks made three trips per 10-hour day, and on many days, about half of the trucks made four trips in a 12-hour

day. A normal day's work of 10 hours included over 120 miles of driving, three loadings each of filled and empty trays and three unloadings of filled and empty trays.

Late in October, the ground at the sod farm became quite saturated and too soft for trucking. Trucks were kept on the roads and sod had to be

loaded on skidsleds, pulled by tractor and transferred to the trucks. This extra operation increased the cost of sod production. If time had permitted and equipment were not at such a premium, a power-operated conveyor would have been developed to load the trucks and reduce the manual labor.

#### Drill Field Processing

The surface soil at the station site is a silty clay loam. It seemed to have only two states—tough gumbo clay when wet and gaseous dust when dry. Soft shale was found everywhere within a depth of 3 ft. This soil is very difficult to drain, quite unstable when wet and readily subject to frost heave. It gives a slightly alkaline reaction. The root-containing top soil seldom was found to be more than 6 in. deep. Even this top layer showed practically no lateral moisture movement. Grading of each field provided for continuous surface run-off and eliminated any pockets where water might collect. Slopes were kept between 1% and 2% as far as possible.

The six drill fields were fairly open and gently rolling fields with few trees and many hedgerows and stone walls. The areas were first

grubbed by bulldozers. All stones and tree roots were removed. All growth was then mowed with tractor-drawn sickle bars, and mowed material was collected and removed. Where regrading was necessary, the low areas were then covered with top soil removed from building sites and high areas were scraped by power scoops and covered by at least 6 in. of top soil. The entire drill field was then plowed by the tractor-drawn gang plows and thoroughly pulverized by discing to a depth of 6 in.

Before any work was begun, a small area with typical slope and soil conditions was tested for growth qualities under several different treatments. Soil analyses indicated satisfactory magnesium and calcium content but a large deficiency of organic matter. A large deposit of peat humus was located near Geneva, N.Y. This was prepared for large scale production and provided all the necessary humus for the entire program. The test plots were prepared by mixing several proportions of bank sand and humus into the disced top soil and planting grass seed. At the end of a month the proper blend of sand and humus was found by noting the stands of grass and the texture of the soil at that time. The best

experimental plot contained 1 in. of humus and  $\frac{1}{2}$  in. of sand mixed with 2 in. of the disced top soil. This formula was therefore accepted for the processing of the fields.

Each field required 2000 cu. yd. of peat humus and 1000 cu. yd. of sand. The materials were stocked in adjacent piles and blended into manure spreaders by a small power shovel with a  $\frac{1}{2}$ -cu. yd. bucket. The mixture was spread over the plowed drill fields to a depth of  $1\frac{1}{2}$  in. and then thoroughly disced to a depth of 3 in. until the entire area was of uniform color. Fertilizer (7-7-5 formula) was spread at the rate of 500 lb. per acre and disced into the surface. The ground was finished for sod laying by double row cultipackers drawn by small tractors.

The average requirement of labor and equipment to prepare one field of about 660,000 sq. ft. was 1100 man-hours of total labor, 12 days of bulldozer use, and 12 days of using plows and discs together with the necessary tractors. A drill field was processed in 10 working days. The blended humus and sand was placed and mixed into the soil in 9 days, using 700 man-hours of labor, 9 days of shovel and truck use, 18 days of

(Continued on page 98)

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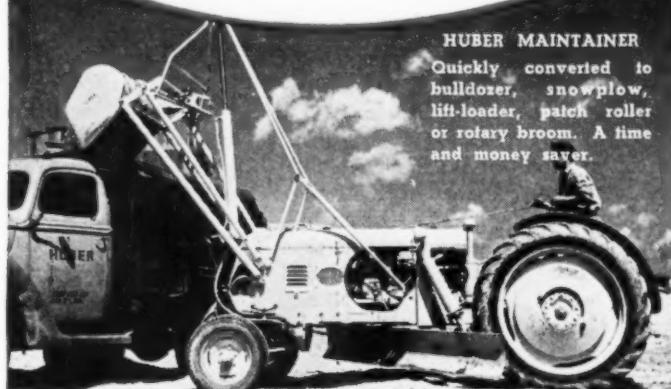
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## Postwar Highway Rehabilitation in the

# Philippine Islands

**Progress made on 33 projects in \$10,000,000 1947 construction program, in spite of personnel and equipment shortages. Standardization of bridge projects, with concrete favored over steel, has helped reduce delays. Two typical projects are described herein, with photos courtesy Public Roads Administration**

**By F. C. Turner**

Division Engineer  
U. S. Public Roads Administration  
Manila, P. I.

**W**AR in the Philippines wrought widespread havoc to the highway system. Scarcely any area escaped damage. Even where there was no large-scale fighting, there was guerilla warfare which resulted in wanton destruction of highway facilities.

In 1945 an inventory was made to assess the extent of the damage. This inventory disclosed that of 1,741 permanent bridges, 621 had been destroyed or badly damaged, and that nearly 3,000 of the 6,352 wooden bridges would have to be replaced, either because they had been destroyed or because of deterioration due to neglected maintenance. Equally serious, though not as spectacular as the bridge demolition, was the effect of military traffic on highway surfaces. Roads adequately designed for the slow-moving carabao carreton were called upon to carry army six-

by-six trucks, often bumper-to-bumper, in an unending stream.

### \$60,000,000 Job

The task that faced the Philippine Bureau of Public Works was a Herculean one. Thirty-five per cent of the highway system was in urgent need of rehabilitation. Engineering and maintenance personnel had become scattered during the war, many were battle casualties, and many more were drawn away after the war by attractive salaries offered in private industry. Offices and records had been destroyed, valuable plans had been lost, and all equipment had been appropriated by the invaders. Revenues had fallen to a low level, since the number of civilian vehicles had been drastically reduced. Meanwhile, because of heavy military movements, the volume of traffic had become much greater than in prewar days. Major shifts in population also had developed needs for extensive improvements to the highway system.

After the liberation of the Philippines, the American Army expended much effort in opening highways for traffic, and most of the important roads were passable by the end of 1945. Much of this work, however, was of a temporary nature. Permanent replacement at the earliest possible moment was imperative if highway transportation in the Islands, already strained, was not to break down entirely.

### U. S. Aid Given

The United States, recognizing the inability of the Philippines to reconstruct their highway system without outside assistance, and realizing the desirability of establishing a stable economy as quickly as possible, proffered financial aid in the rehabilitation of Philippine highways under provisions of an act passed by Congress in April, 1946. This legislation authorized funds to assist in the restoration of highways and other war-damaged facilities and to construct new projects that would further the economic development of the country and which might be of primary importance to the national defense. The United States Public Roads Administration was designated as the agency to handle the highway features of the rehabilitation program.

A division office, staffed with experienced Public Roads Administration employees, was established in Manila to direct the work. An allocation of approximately \$10,000,000 in the fiscal year 1947 was sufficient to allow the programming of 33 construction projects consisting of the repair or replacement of 27 bridges, the construction of approximately 31 kilometers of concrete pavement, 48 kilometers of intermediate type bituminous surfacing, and 47 kilometers of low-type bituminous surfacing intended as a temporary dust palliative on roads subjected to heavy military traffic.

A second allocation of \$12,375,000 has been made for fiscal year 1948. One hundred and sixteen projects have been programmed and approved,



★ Spreading cover aggregate on a Philippine reconstruction project



★ Hand-work on Santa Mesa Boulevard. The need for reconstruction was so great that the work could not be deferred until modern concrete paving machinery could be obtained



★ Pouring concrete curb-and-gutter on Quezon Boulevard. Job-made wooden forms were necessary since steel forms were not available

accounting for about 75% of that allocation. The projects aggregate 315 kilometers in length and include 93 bridges. Other projects will be added as rapidly as sufficient information can be assembled. Similar allocations are anticipated for the next two fiscal years.

The Philippine Bureau of Public Works is responsible for actual engineering location, design and construction control. Work is to be done under contracts awarded after competitive bidding. Public Roads Administration representatives exercise only general supervision and serve as consultants to local authorities. This procedure will develop a strong local highway department and assist in the rehabilitation of the contracting industry.

The rehabilitation program is planned to crowd into four years, work that would require normally about 15 years, at the risk of seriously overtaxing the facilities of contractors. It has been difficult to interest American contractors because of the volume of work offered in the United States.

#### Lack Modern Equipment

There is a serious lack of modern construction equipment in the Islands. The necessity for immediate rehabilitation of 35% of the highway system makes hand-labor methods totally inadequate.

It was believed that ample equipment could be acquired from war-surplus stocks stored in large quantities in various depots throughout the Islands. Equipment obtained from that source has been useful in starting work, but the supply is not as large as had been expected. Much of the available equipment was specially designed for army use and not well adapted for peace-time use where economy of operation is a major

factor. Too, much of the available equipment was not in operating condition, due to wear, deterioration and lack of proper protection and care. Repair parts have been hard to get,

and many units have been discarded for lack of repairs.

In order to expedite the work, a pool of essential equipment has been established. This pool has been stocked



★ Completed six-lane concrete pavement. This pavement was placed using 14-S mixers and hand-batching and finishing in the absence of any concrete paving equipment



★ Santa Mesa Boulevard in Manila, showing one roadway of the divided roadway section completed and the fine-grading for the other side under way



★ (Left): Wrecked steel span over the Agus river at Dansalan, Mindanao Island. (Right): Temporary, make-shift repairs were resorted to in order to open the roads to traffic

with units obtained from surplus stock and with new machinery purchased in the United States. Contractors are allowed to draw upon this equipment pool, on a rental basis, to supplement their supply of road-building machinery.

While war has done much to bring new skills and new trades to workmen in the Islands, the changeover from hand labor to mechanized methods cannot be accomplished overnight. Operators have to be trained.

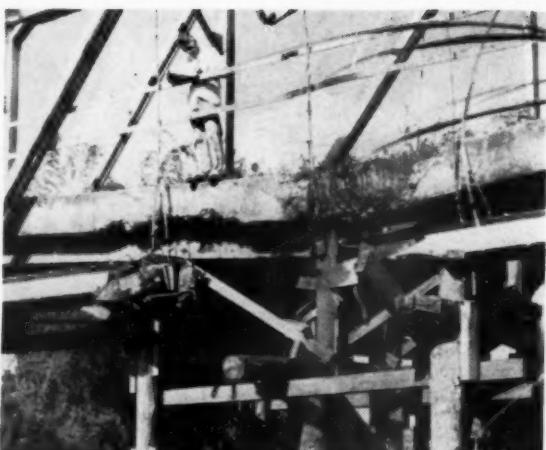
#### Bridge Projects Standardized

The scarcity of materials, particularly steel, has delayed the bridge reconstruction program. In the early stages of the program steel suppliers talked in terms of 12 to 18 months delivery, and then only at prices current at the time of actual delivery. Naturally contractors were hesitant

about bidding under those conditions.

Three methods have been adopted to improve the situation: (1) Wherever possible, reinforced concrete design has been favored over structural steel, even though it may be more costly. (2) In order to simplify fabrication, a few standard span lengths and designs have been adopted. Every effort is made to use standard unit lengths wherever possible. (3) A supply of reinforcing steel has been obtained and stocked. This is distributed to contractors as needed, so that they will not be forced to negotiate for firm prices and definite delivery dates each time before submitting bids.

Gravel, sand and crushed stone are available but modern methods of producing them in adequate quantities are lacking in most localities. A gravel plant and a rock quarry have been obtained as complete operating



units and are producing material for use in the Manila area. Local quarries are being opened up on a commercial basis, and the aggregate supply is rapidly increasing, but it will be necessary to obtain additional portable crushing and screening units for use in outlying provinces if highway construction is to progress as it should.

Despite all these handicaps a fair start has been made on the actual accomplishment of the rehabilitation work. By the end of 1947 almost all the projects included in the first year's program were either completed, under construction, or had been advertised for contract.

#### Two Typical Projects

Typical of the work accomplished are two projects which involved the reconstruction of portions of two main thoroughfares entering Manila from the northeast. These are Quezon Boulevard and Santa Mesa Boulevard. Both had been partially completed before the war. The proposed reconstruction followed practically the same design as had been used in the initial construction.

Plans for these projects were started early in 1947 by the city engineer's office, working in cooperation with a PRA representative. As the highway was to be of the latest modern design and of a somewhat different nature than had formerly been built in the Islands, a public roads engineer was detailed to work with the local designers and to lend technical assistance needed in preparing the plans and specifications.

Contracts were awarded in 1947 to two local contractors. The Quezon Boulevard improvement is 1.4 miles in length and the Santa Mesa project is 0.5 mile long. The items of construction and design for the two projects were practically the same. In order to preserve the existing base



★ Provincial road in Mindanao showing the cumulative effect of neglected maintenance and heavy Army traffic on a lightly-graveled road

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★ River crossing on the road north of Manila, showing the wrecked concrete abutment of the original structure and an Army-built Bailey span which provides temporary traffic service

and gravel surfacing as a foundation for the new concrete pavement, grades were laid to conform to the old surface.

The design called for a 6-lane divided concrete highway with curb and gutter and bituminous sidewalks on each side of the roadway. The concrete surface in each lane is 39 ft. wide between curbs, and the roadway is divided by an earth-filled median strip 8 ft. wide. The concrete surface is 7 in. thick and unreinforced. Three-quarter-inch expansion joints were specified at 200 ft., and weakened plane or "dummy joints" were introduced at 66-ft. spacing. The 36-ft. width is divided into two 11.5-ft. and one 13-ft. strips by longitudinal construction joints. Half-inch round tie bars were placed at one-meter intervals across the longitudinal joints;  $\frac{1}{4}$ -in. load transfer bars were used at expansion joints.

Future municipal plans contemplate the placing of gas, water and telephone lines underground outside the roadway limits and within the sidewalk area. For this reason bituminous sidewalks were specified on each side of the roadway to serve until the utilities are installed. Permanent concrete walks, 6.5 ft. wide, will then be constructed.

#### Pavement Design

Unit prices in the preliminary estimate were based on prevailing labor rates and costs of materials used by the city engineer's office on repair work under way in Manila. Since there had been no contract work before this in the postwar period from which to derive construction costs, and since material costs and labor rates were decidedly higher than in prewar years, the preliminary esti-

mate of cost was largely a matter of guesswork.

The Santa Mesa project was the first let to contract. The low bid was \$370,098. This was considered reasonable and was accepted. Unit quantities and bid prices of major items were as follows:

Item	Quantities	Estimated Unit Price	Contract Bid Price
Preparation of base.....	77,030 sq. yd.	\$0.40	\$0.213
Curb and gutter .....	29,207 lin. ft.	3.25	4.08
Asphalt paving .....	20,690 sq. yd.	1.55	1.75
Concrete pavement .....	55,064 sq. yd.	4.00	5.49

Bid prices obtained on the Quezon Boulevard project were comparable to these.

The projects were laid out and supervised by engineers from the Highway Division of the Philippine Bureau of Public Works, with technical assistance from the Public Roads Administration. Specifications for the work followed those in effect on similar work in the United States, using AASHO and Public Roads FP-41 standards as guides.

At the time work was started, paving forms, curb and gutter forms, and similar items for the specified design were not available, and had to be made on the project from local materials. Modern batching plants, pavers and finishing machines were lacking. Consequently, a large portion of the work had to be done by hand labor. A few motor graders, rollers and scrapers were used in the grading and preparation of the base. Aggregate production, batching, mixing and finishing were practically all done without the benefit of modern equipment.

A screening plant had been procured from the U. S. Army and was utilized to the limit of its capacity in the production of concrete aggregate. This supply had to be supplemented

by material obtained from river deposits, which were shoveled, screened, washed and loaded by hand. Several 14-S concrete mixers were used for mixing the concrete. These were charged by hand by means of wheelbarrows loaded from stock piles of aggregate placed along the grade. All placing, striking off, and finishing of the concrete were hand operations, and tools used for this work were made on the project.

Because of the lack of modern plants and experience in this type of construction, problems of control were always arising. It was difficult to obtain uniform aggregate gradation, the operators and finishers consistently urged wetter mixes to facilitate placing, and the finishing had to be checked continually to avoid irregularities in the surface.

Since these projects were completed, a central batching plant, concrete paver, and finishing machines have been obtained by the Public Roads Administration and placed in the equipment pool to be available for use on other projects. At least two complete plants have been ordered by local contractors, and diffi-

culties encountered on these first projects will be avoided on subsequent work.

These projects were the first major postwar highway construction in the Philippines, and were undertaken under difficult conditions. They demonstrate the transition that is occurring in highway construction methods in this part of the world. They have shown that modern equipment and efficient processing plants are essential in speeding up the program of reconstruction and thereby hastening the economic recovery of the Philippines.

By bringing their skill and their experience in modern construction methods to aid in the rehabilitation program, American contractors could be of great service to a grateful and friendly nation. Their participation is needed and would be welcomed by both the Philippine Bureau of Public Works and the Public Roads Administration.

A measure authorizing building of a toll road in Kentucky as one link in an ambitious Chicago-Miami toll road network has died in adjournment of the Kentucky Legislature.

## Recommendations for the Best Use of

# Parking Meters

The following excellent summary was published by the Louisville Area Development Association in their monthly planning bulletin in connection with recommendations that meters be installed on certain Louisville streets where parking will not impede the flow of traffic

THERE is no one solution to the universal parking problem, but there is one approach which, among others, is being widely used by many cities — the installation of parking meters. First installed in Oklahoma City in 1935, the meters were immediately successful as a method of controlling parking practices in congested areas and as an aid to enforcement. By September 2, 1947, 1,364 cities in 47 states and the District of Columbia were operating parking meters. While meters cannot bring into use additional curb space, they do create a greater turnover at the curb and are self-enforcing to some extent. A report on parking meters, made for the use of the L. A. D. A. Parking Committee and other interested groups is summarized below.

For many years cities attempted to solve the problem of the short-time parker who had business to transact in the down-town business district by placing legal restrictions on the length of time he could park on busy streets. However, short-time parking is excessive in enforcement cost, and all-day parkers often monopolize the limited street parking space in spite of regulations.

### Purpose of Meters

Meters are intended to prevent all-day, over-time, and double parking, and the tying up of traffic and damage to automobiles caused by parkers who try to crowd into too small spaces.

Briefly, the main purposes of meters, are:

1. To improve the enforcement of parking regulations.
2. To reduce moving traffic by reducing "cruising" while looking for a parking space.
3. To reduce the average parking

time per car, resulting in greater turnover and a more efficient use of available curb space.

In addition, meters produce revenue which helps to pay the cost of traffic regulation. Some of this is derived from non-residents who use city streets and add to the traffic problem. Meters should be considered, however, as a traffic control measure, rather than as a source of revenue.

### AAA Resolution

A resolution adopted by the American Automobile Association in November, 1947 states:

"Meters should be used only where the demand for limited-time parking greatly exceeds the supply of such parking space at the curb. They should be used only where other traffic needs, such as movement and loading, do not warrant the elimination of parking; and parking meters should be removed when the space is needed for movement and loading. Parking meters should not be used where there will not be sufficient police assigned to supervise their use and to apprehend violators; and an ordinance provision should specifically prohibit insertion of a second coin as a means of exceeding the legal parking limit."

### Legality

Ordinances providing for the installation and operation of parking meters have been challenged in many jurisdictions. In all but a very few cases, the courts have held that meters are legal as an aid to enforcing curb parking regulations where their announced intent is for enforcement or control purposes. They are now so generally used that questions as to their legality are few.

The legality of parking meters in Kentucky is unquestioned, since over thirty municipalities in the state now

use meters and the Court of Appeals upheld them in a 1942 case involving Louisville.

### Revenue Produced

Annual revenue per meter varies, of course, not only according to the size of the city, but with the demand for parking, enforcement practices, and location of the meters.

Of cities in Louisville's population bracket (250,000-500,000), sixteen of the twenty-three now use parking meters, and for the month of September, 1946, their gross revenues averaged \$6.30 per meter. On an annual basis, this compares with other estimates of \$75.00 per meter per year.

The cost of meter operation is low and net yield is correspondingly high for a service fee. Operating expenses run between 10% and 20% of gross revenues. Most cities have been able to cover the cost of purchase, installation, and operation out of the first year's revenue.

Meter revenue will probably remain fairly stable for a long time to come, since meters were first installed during a depression and continued to be successful during the years of gas rationing.

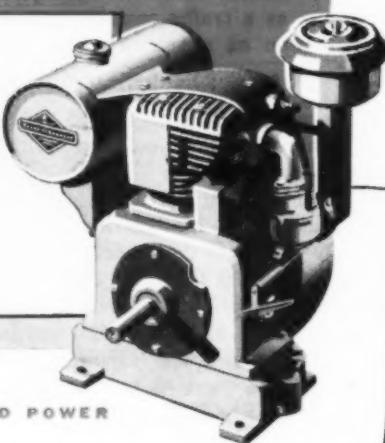
### Use of Revenue

Most meter ordinances provide that the revenue be used for the improvement of traffic conditions. "Profits" are ear-marked for traffic enforcement, traffic engineering, off-street parking facilities, etc. The Eno Foundation for Highway Traffic Control, in a study of parking meters, states:

"Public officials must not be so short-sighted as to reduce normal budgets of agencies receiving meter revenues. In some cases budgets were reduced by the amount meters would produce, in effect marking meter revenues for the general fund."

A number of cities are now using meter revenues to finance the purchase of off-street parking lots. Since meter revenues are collected from a special group, it is logical for cities to spend these funds to improve parking conditions for the benefit of those who pay the fees.

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The American Automobile Association, in its Parking Manual issued in 1946 says . . . "where there is a profit from the operation of parking meters it is recommended that such funds be used for the provision of off-street parking facilities."

#### Types of Meters

Types of meters vary widely, but in general they are mechanical timing devices set on standards about 18 in. from the curb. They are spaced at intervals sufficient to insure easy parking. When the motorist parks his car, he inserts a coin in the slot.

In the manual type of meter, a lever must be turned by the motorist after the coin is inserted to activate the machine. In the automatic type a falling coin starts the mechanism.

The timing mechanism on the meters runs for a designated interval. Depending on types of business and the concentration of traffic, rates vary from 1c for 12 or 15 minutes to 5c for one-half, one or two hours.

The multiple-coin machine takes one or more coins of a single kind and allows parking for variable periods, depending on the number of coins inserted. For example, some permit the motorist to park for 12 minutes for 1c and additional time for additional pennies up to a pre-determined limit.

Single-coin parking meters take only one coin at a time, whether nickels or pennies. This type does not allow the motorist to pay in proportion to how long he wants to park. The 15-minute parker must pay the same fee as the one-hour parker.

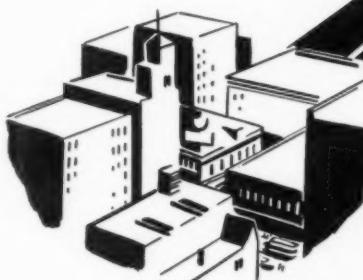
The combination meter permits the use of either pennies or nickels. It will take one or several pennies for varying parts of an hour or five cents for a full hour's parking. On the basis of 1946 data, the majority of meters in most cities take nickels and pennies.

At the end of the designated time period, a signal is displayed to indicate the time is up. If the motorist removes his car before his time is up, another parker may use the remaining time. If the motorist leaves his car longer than the period permitted, the police tag his car.

#### Enforcement

Experience has shown that meters enforce parking regulations more effectively than the police officer who patrols streets and marks tires. They induce a very high rate of voluntary observance, although they do not appreciably reduce police requirements insofar as manpower and equipment are concerned. It should be emphasized that the police should be available to handle emergencies.

(Continued on page 101)



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★ Showing how mulch can be thrown high up sides of cut slopes

Photos by author

# Straw Mulch

## Placed Rapidly by Machine Methods

By C. R. Hanes,  
Field Engineer, Bureau of Construction, Ohio  
Department of Highways, Columbus

PLACING of straw mulch, which is required in connection with seeding roadway shoulders and slopes on new construction projects in Ohio, has been an operation requiring considerable hand work. Due to scarcity of labor available for such purposes, Edward W. Richards, Contractor, of Dover, Ohio, has devised a method of placing of such material which has resulted in a considerable decrease in the amount of labor necessary and at

the same time permitted the work to be accomplished much faster and more uniformly.

The equipment consists of an ensilage cutter, such as is used by farmers in cutting up green corn and blowing same into a silo. The cutter has been adapted to the mulching operation. The modifications consist of changes in the feeding and blowing part of the equipment.

The straw is fed into the cutter, the straw pulling apart permitting it to be uniformly blown into place. This is particularly advantageous where baled straw is used which may have been in storage a considerable length

of time and which is very difficult to separate by hand methods to permit uniform placing.

The movable stack allows the material to be directed as necessary which is quite an advantage on long slopes.

The blower unit has placed from 12,000 to 18,000 sq. yd. of mulch per day using a force of 5 to 6 men. A force of 20 men has been required previously to place approximately 8,000 sq. yd. of mulching per day on similar areas by hand methods.

Blower and stack equipment used thus far enables straw to be placed

(Continued on next page)



OLD WAY—A score of men needed to make 8,000 ft. of headway per day



NEW WAY—A five or six man crew progresses 12,000 to 18,000 ft. daily

# Road Problems in North East Texas

THE project of Public Construction Co. here pictured represents an example of the varied tactics being employed by District No. 1 of the Texas Highway Department to make funds stretch over as many miles as possible under adverse soil and weather conditions. Of course, these problems don't worry the contractor, except that some jobs are stickier than others in wet weather.

This district has a reputation of being one of the worst and trickiest in Texas, from a rainfall and soils standpoint. The predominate soil is highly plastic clay. The average yearly seasons include extended, dry, hot weather followed by several months of heavy rainfall. This combination of plastic soil and alternate wet and dry seasons results in very weak subgrades.

District Engineer F. M. Davis and the personnel under his supervision deserve a lot of credit for their resourceful approach to the job. It has been found economical to go to considerable lengths in construction and maintenance of subgrades in order to get durability with low-cost design thickness of flexible bases.

## Try Subgrade Seal

Much experimenting with soils and surfacing materials has been done in the form of test sections on projects. On one project, back in 1940, a 1½-gal. asphaltic seal was placed across the subgrade and covered with 1 in. thickness of granular soil before placing concrete pavement. This road has stood up very well, showing success in maintaining a constant moisture condition in the subgrade. The soil under this road is a high-swell clay (LL 100, PI 70). The subgrade seal idea was applied again last year on a new black-top road employing local soft limestone as sub-base material.

Five soil-cement projects have been constructed. All but one are proving successful in handling the traffic they are subjected to. The one exception consists of 7 in. thickness of S-C directly on weak subgrade and is subjected to a considerable amount of heavy truck traffic. If additional construction is not delayed too long, the

soil-cement would make a good subbase.

The need to compromise and improvise really came with the launching of Texas' postwar farm-to-market program in this district. The first postwar farm-to-market project consisted of soil-asphalt 3 in. thick by 16 ft. wide, plus seal. The F-M program is sound because a designed base with dustless surface is being put down, and that only after proper drainage, culverts and small bridges have been installed. The F-M program is to consist of as many miles as can be built durably in this district, about 40 miles per county during the first three post-war years.

## Crown-Width Seal

From 15 to 20 in. of granular base or from 7 to 9 in. of concrete pavement seems to be the need for medium traffic roads over typical soils in the N. E. Texas area, provided effective methods are used to construct and maintain the subgrades. Moisture control is one of the big problems. An inspection trip by this editor during April, 1947, when the ground was quite saturated everywhere, showed the tell-tale evidences of prevalent failure along the outer five feet of width along either side of some black-top roads. This clearly indicated that subgrade is weaker near the edges of the pavement where it is exposed to alternate wetting and drying than near the center where the moisture remains constant.

In order to determine just how much weaker the subgrade is when exposed to alternate wetting and drying, plate tests have been run on subgrades under base of various ages. As a result of these tests and observation of the behavior of roads in service, the conclusion has been reached in the district that, in areas of high-swell clay subgrades, it is cheaper to build and maintain crown-width granular bases and impervious seals than to attempt to provide enough thickness to be adequate for bases only as wide as the traffic lanes.

## Straw Mulch Placed Rapidly By Machine Methods

(Continued from page 96)

in 30-ft. cut slopes and 30 to 40-ft. fill depths, operating from the shoulders. The unit may also be used from top of cut and bottom of fill, where adjoining conditions permit the truck to operate.

In addition to the obvious advantage of placing the mulch much more quickly and cheaper than by old methods, the straw is placed in such a manner that it stays in place much better than when placed by hand methods.

**Steel Industry Has 94,230,000 Ton Capacity**—Steel companies of the United States possess 944 open hearth furnaces, 29 bessemer converters and 217 electric furnaces according to the American Iron and Steel Institute. Those furnaces have a combined annual capacity of 94,233,460 tons of ingots and steel for castings, more than ever before in peacetime. Twenty more steel furnaces were operating on Jan. 1, 1948, than a year earlier, and six more blast furnaces were active.



★ First postwar farm-to-market road project in the Paris highway district—consists of 3 in. of soil asphalt 16 ft. wide, built on a well drained base and given seal

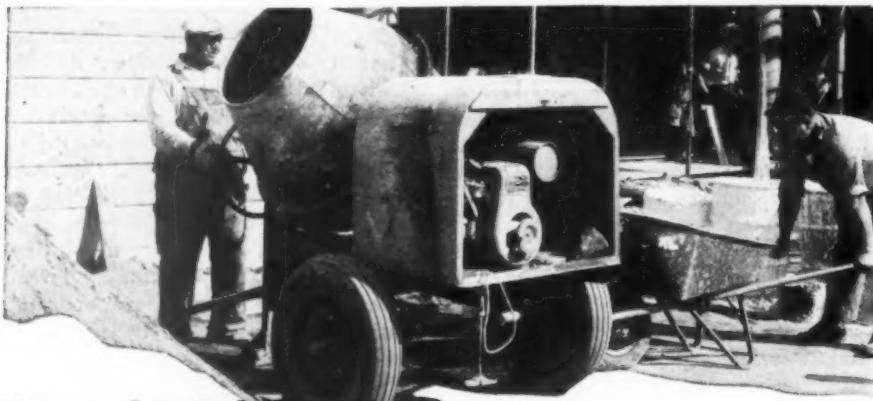
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## Sod—Its Production and Placement at Sampson, N.Y. Naval Training Station

(Continued from page 86)

spreader use, and 11 days of disc and tractor use. Most of the labor was in connection with the operation of equipment. Farm hands were used as much as possible, arrangements having been made with construction labor unions.

### Sprinkler Piping

Each field contains three lines of water connections across the narrow dimension, with several below-surface hose connections. These lines which provided watering facilities were laid after each field was processed and the disturbed surface was repaired by hand rakes. This sequence of installation was determined to prevent injury to the pipes during the plowing and discing operations.

### Sod Laying

Sod was delivered on trucks to the immediate location of the sod laying. Truck tracks were raked out by hand. Sod racks were lifted from the trucks by two men who passed a rack over to two others on the ground. The sod was then slipped off the racks into the desired final position, 8 sq. ft. being placed in one operation. Sod sections were laid as snugly as possible.

After a large section was laid, it was top dressed  $\frac{1}{4}$  in. deep with a pulverized sandy loam, prepared by mixing sand with the native top soil. Fertilizer (7-7-5 formula) was then broadcast on the sandy loam, using 200 lb. per acre. The loam and fertilizer mixture was then pushed into the sod, especially along the joints, with the backs of steel rakes. The finished work was then rolled with 500-lb. hand rollers, watered immediately and again watered about 3 times each week for 2 to 3 weeks.

The grass established itself almost immediately, especially since the sod had been cut thick enough to provide almost 2 in. of soil on top of the processed field. An inspection of the fields in June, 1943, showed an even tough surface which made ideal drilling areas and showed little wear from daily use. In 1946 the areas were solid stands of grass and the growth showed no lines of demarkation between sod strips. Grass had been kept mowed to  $1\frac{1}{2}$  in. height.

Sod laying progress was synchronized with the rate of production at

(Continued on page 126)

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POISON IVY (Fig. 1)



POISON OAK (Fig. 2)



POISON SUMAC (Fig. 3)

## Poison From Roadside Plants

### Poison Ivy, Oak and Sumac, and What to Do About Them

From "The Guide Line"

published by

Liberty Mutual Insurance Company

**P**OISON ivy, poison oak and poison sumac are found in all parts of the United States. They grow usually in uncultivated areas such as in woods and thickets, along fences and around trees or poles.

Poison Ivy (See Fig. 1) is easily identified by its dark green color and its smooth, oval-shaped leaflets which grow in groups of three. When mature, the plant bears a white, waxy berry and the leaves turn scarlet early in the fall.

Poison Oak (See Fig. 2) is a variety of poison ivy and occurs as a small shrub whose leaves grow in groups of three with a hairy or deeply toothed appearance.

Poison Sumac (See Fig. 3) is a shrub or small tree which sometimes is 25 ft. tall. It is found in swamps or in wet ground. The leaves occur in groups of from seven to thirteen—smooth and sharply pointed. Long, narrow clusters of blossoms and later smooth white berries spring from the notch between the leaves and the stem, while non-poisonous sumac has its first fruit at the end of the branch. In the spring the new leaves of poison sumac are bright orange. Later they become a dark glossy green and turn to a brilliant red in the fall.

Poisoning from these plants may occur when: 1. Any part of the body comes in contact with any part of the plant. 2. Any part of the body is exposed to smoke from the burning plant. 3. Clothing or other objects which have previously been exposed to the plant come in contact with the skin.

Nearly every person coming in contact with poison oak, ivy or sumac is poisoned. Failure to pick it up once does not mean that the same person will get by again. Some persons are more liable to get poisoned again after having had it once. A popular but dangerous belief is that protection against poisoning may be had by eating the leaves of the plant. Fatalities have resulted from this practice.

#### Preventive Action

Protection against poisoning from these plants: 1. Learn to recognize the plants. 2. When working near poison plants, gloves with heavy leather gauntlets should be worn. Shirt sleeves should be tucked inside the gauntlet and the shirt collar should be turned up to prevent contact with the plants. Workers should tie the bottoms of trousers at the ankles well below the tops of their high shoes. Leather leggings are also good protection. Care should be taken in removing clothing since the oils from the plant may remain on clothing for as long as a year. 3. Clothing should be dry cleaned as often as possible, as soap and water are not always effective. 4. The uprooted plants should be burned, but the workers should stand clear of the poisonous smoke.

If these plants touch any part of the body, wash that part with plenty of laundry soap and water five or six times and then apply a 5% alcoholic solution of ferric chloride. Do not use a rough cloth or brush in washing as it may irritate the skin and spread the poisoning.

If irritation develops, a physician should be consulted at once.

For relief from severe itching, apply calamine lotion. Light gauze bandage should be applied over the lotion until a physician can be seen.

### Recommendations for the Best Use of Parking Meters

(Continued from page 94)

sized that enforcement of meter regulations is absolutely necessary in order to obtain satisfactory results.

#### Collection

Collections are usually made either by employees of the finance department, works department, or the police. Their frequency varies with intensity of use. Miami uses the Armored Car Service rather than city employees to collect revenue from the meters.

#### Installation

Meters can well be used in all zones where time limits are established, with varying rates depending upon demand for curb parking.

Parallel parking permits approximately five cars per 100 ft. of curb space. However, with the new longer cars, 22 ft. is recommended as a minimum except when the space is open at one end. When the time limit is short—10 or 15 minutes—stalls should be 24 ft. in length so that cars may enter and leave with more ease and interfere with traffic as little as possible. If the meters are crowded together too closely they will defeat their purpose.

It is desirable to maintain clearly marked stalls to promote better parking and prevent crowding cars together.

#### Turnover

Meters cannot bring into use any additional curb space for parking. However, they do provide curb parking for a greater number by creating a much greater turnover. Studies in other cities indicate that use of meters often doubles curb turnover.

Some ordinances provide for the free use of unused parking time remaining indicated on a meter. This helps to show the good faith of the city in attempting to regulate parking rather than using them as a revenue measure. It will also encourage quicker turnover.

●  
**New York State Sets Safety Record**—Although there were more motor vehicles in New York State than ever before, and although they travelled more miles than ever before, the state's motor vehicle death rate was lower in 1947 than in history. It was 7.2 per 100 million vehicle miles.

# How New York City Dug Out

- Peak force of 4,900 machines and 26,600 men attacked the big Dec. 26 snowfall
- Stalled and curb-parked vehicles biggest obstacles
- Existence of detailed, rehearsed snow-fighting plan biggest asset in moving unprecedented snow tonnage

★ Afternoon of Dec. 27 on 42nd Street. Only twelve hours since the end of the storm, but a combination of plowing, loading and use of salt—plus prompt action on walks by property or store owners—had opened up this important mid-town thoroughfare



By Harold J. McKeever

Editor, ROADS and STREETS

NO matter how you spell it, the answer is havoc when 26 inches of wet snow drops in on the world's largest city in less than twenty-four hours. New York City residents are still talking about the storm of last Christmas, which exceeded the famous blizzard of 1888. Well headlined was the almost complete paralysis of street traffic and rail commuter service. Less well-appreciated is the fact that the city forces did a fine job under the circumstances.

What happened? How did the city dig out? What lessons were learned, problems spotlighted? Let us take up these points one at a time.

First, to recount briefly the storm itself and the trouble it brought. Snow began falling at 3:20 a.m. on Friday, Dec. 26. New York's millions who rode to work early that day at first gave the snow little thought. The weather forecast was for a fairly heavy storm, maybe five to ten inches, so what? But as the morning progressed, the heavy, wet flakes fell thicker and faster, until at times you could "hardly see twenty feet." From 7 a.m. to 1 p.m., 19.14 in. of snow fell, a max. of 3.76 in. falling in one hour. By midmorning, taxis and buses were having a time of it, and all of a sudden panic spread through the city and people who could leave their work all started for the transportation lines. Uncounted thousands never got home, but spent the night in hotels, downtown offices, doorways, or sitting in stalled suburban trains.

## Snow Tonnage Estimated

By 3:05 a.m. of the 27th, when snowing ceased, 25.8 in. had fallen, exceeding the largest previous, *24-hour fall by about 8 in.* An estimated 144,000,000 cu. yd. of snow, or 17,323,000 tons, fell on the city's walks and roadways, 99 million tons on the whole city.

The month-long effort to dig out cost New York City over \$7,000,000 in direct snow clearing, sanding and de-icing expense. Name your own figure for the economic loss due to the traffic tie-up and attendant loss of business. And name your own value for the hardships from shortages of fuel oil, blocked coal deliveries, electric power failures, shutting down of schools, etc.

Fire lanes and arterials were partially opened up next day, the 27th, but it was several days before truck, bus and other transportation was restored to a semblance of normal. Officials don't like to dwell on the ugly, frightening fact that the city's fire lanes were for a time largely blocked. Working on a "first things first" basis, the city crews skipped many outlying residential streets, some of which were

still reported blocked several weeks later.

Coming back to the time of the storm, the snow crews were mobilized on an emergency basis, putting into effect a thoroughly worked out plan and procedure that had been prepared in manual form. The unprecedented depth of accumulated snow, however, soon stalled vehicles in the streets. Many vehicles were abandoned. Normal plowing couldn't proceed without first performing a wholesale job of winch-truck work.

After the snowfall ceased, the city's working plan was quickly stepped up until at the peak 20,600 emergency laborers and 4,929 special truck drivers were employed in a 24-hour period. The department's own fleet of 1,361 plow-equipped garbage collection trucks was largely out working, as were 1,108 other city-owned power units, plus 2,003 hired machines and 820 units supplied by snow removal contractors previously engaged.

#### Kinds of Machines

It is of interest to note what types of units were pressed into service. The 1,108 city-owned units comprised 62 rotaries (Snogo), 68 eccentric arm loaders (Joy), 46 bucket-type loaders (Nelson), 550 crosswalk plows, 48 snow brooms (for bridges and expressways), 113 sand and salt spreaders, 40 wreckers, and 181 flusher tanks.

The hired equipment included a maximum of 1,583 trucks for hauling or plowing, 116 clamshell cranes, 228 bulldozers and 76 winch trucks. The contractor equipment consisted entirely of snow-loading and hauling units.

Plowing, clearing and loading work continued all through January, complicated by the continual below-freezing weather and the fact that a total 15.1 inches more snow fell on 18 different days. The cumulative winter total reached 44.1 in. by Jan. 25, or more than the normal fall for an entire



★ As far as the eye could see, this is the scene that greeted New Yorkers the morning of Dec. 27, after snow had ceased falling. Snatching came before plowing

Acme

shovel worker.

#### Long-Perfected Routine

Snow removal methods were evolved through the years, and latest procedures are outlined in the Bureau's "Operations Manual No. 1," dated Oct. 1, 1947. Borough superintendents, assistant superintendents and snow supervisors are responsible for carrying out the job in their respective boroughs, and in turn there are district superintendents. In event of snowfall outside of regular working hours, borough supervisors and higher personnel report to their offices. District superintendents and garage foremen report to their respective garages. Officers assigned to bridges report to their bridges. And so on.

A number of sanitationmen, who man the huge fleet of heavy garbage trucks, are assigned as loading and dumping foremen, to check the operations of both hired and contract trucks. The 60 district superintendents have absolute authority in the selection of these men for duty, and also the assignment of timekeepers for inspection of labor crews, clerks for the preparation of emergency snow payrolls, contract snow clerks for recording the work of contractors.

Borough training schools for instruction of officers and sanitationmen in handling of snow equipment were required to be begun by last Sept. 22. \* These classes were also specified to be attended by the foreman, assistant foreman and the eight most competent operators from each district who had previous snow experience. All available men with chauffeurs' licenses not regularly assigned to



★ Clearing intersections and cross-walks is considered the key to fast relief in New York's snow procedure. Scores of rented dozers aided after the big storm, Dec. 28, 1947



★ Light plow-equipped units normally concentrate on piling at intersections, opening up walkways, etc., and aid in sewerage snow, Broadway at Reade, Dec. 27, 1947



★ Over in Hoboken—a Nelson loader doing its stuff. Loaders of various kinds proved indispensable during the big storm

automotive equipment were assigned to driving or loading duties. As in past years, they were to take turns working as drivers and loaders on sanitation trucks to gain experience.

Similarly, under this manual an elaborate system of application, rating and checking is maintained for emergency truck drivers, who are selected from Civil Service lists. These men are rotated systematically, so as to provide a spread of employment and training, their names being chosen in accordance with their places on the list. Laborers, while selected only on a citizenship basis, are required to furnish photos of themselves and systematic records are kept on them for payroll, safety and other purposes. Laborers must carry a snow registration card at all times while on duty, for identification. Laborers are charged at prescribed rates for tools lost.

#### Readyng of Vehicles

An equally thorough procedure has

been worked out for preparation of vehicles during the fall months. Beginning Oct. 20, 1947, district superintendents were directed to see that all types of lifting devices were installed on trucks and flushers assigned to snow work. The hydraulic lifting equipment was inspected at the Central Motor Shop as the machines report in rotation for their monthly preventive maintenance routine.

Hydraulic equipment was required to be attached to the same trucks as in the previous winter. The installation was inspected in each case by raising and lowering the plow at least five times to allow the oil to circulate, and by allowing the plow blade to remain in raised position for at least three minutes to double-check against oil leaks. When blades do not stay in raised position, and leakage is hence indicated, the unit is slated for repair, the manual continues. It also provides (pre-season) that hydraulic oil level be checked on all equipment; casters on new-type blades be adjusted

so that cutting edges rest on the ground; water be thoroughly drained from tank, pump and feed lines on all flushers assigned to plowing, etc.

Engines on all loading machines were tested every third day as winter approaches, by running at idling speed for 30 minutes. Crosswalk plow motors are warmed up for 5 minutes, and broom units run around the block.

Beginning Nov. 8, 1947, all collection trucks were equipped with chains as they came in on Saturdays, to be ready for emergency over the weekend. Drivers were required to spot trucks in the garages in such a position as to leave clear space for rapid attachment of plows.

#### Operating Instructions

Rotary snow brooms are ordered out at the beginning of a snow storm, for the purpose of sweeping bridge floors and expressways. Sand and salt spreaders also are sent out at once, but salt is not allowed on bridges, bridge approaches, concrete pavement, or within a block of underground street car cables.

Instruction of assigned men in the correct method of plowing was begun by Nov. 3, using actual equipment in demonstration. Plow routes varying from  $1\frac{1}{2}$  to 5 miles were assigned about that time, routes being laid out for a maximum round-trip time of two hours. Operators are required to work their routes continuously until snowing ceases, at which time the route normally is fully cleared. Plowing begins only when in the district superintendent's judgment clearing cannot be maintained by use of salt alone.

Detailed instructions in the Manual include the following:

"The purpose of plowing is to clear snow from the travelled area of roadways by plowing it to the sides or centers of streets, express highways, and bridges, and further to clear crosswalks near side car and bus stops, intersections and catch basins.

"Crosswalks must be cleared of snow for a distance of at least twenty feet in all directions.

"No crosswalk plow shall be used for piling or sewerage snow until all crosswalks in the district have been cleared.

"District Superintendents will have section officers organize small gangs of laborers to augment the force of crosswalk plows for the purpose of clearing crosswalks. This work will be the first to be performed when orders are issued to begin work on snow.

"All plows will be operated with and in the direction of traffic. Plow blades will be set lightly on the

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ground. Blades will be set at an angle in the last hole of semi-circle, either right or left, to plow the snow towards the center or the curb, in accordance with the schedule for each route.

"Plows will be worked in teams of two or more machines. The second plow will be operated close to the rear of the first, and in position to take the ridge made by the first plow. The second plow will at the same time clear an additional area equal to that cleared by the first machine. Supervising officers will see that this procedure is followed.

"Should drifts or accumulated piles interfere with the free operation of a plow, no attempt will be made to move all the snow at such points with a single operation. One plow may be operated directly in the rear of another, the first with the blade raised to remove half of the snow and the second, with the blade lowered to remove the remainder. This precaution is necessary in order to avoid serious damage to plows and motor equipment."

### Sewering Regulations

In New York City, dumping of snow into sewer manholes is considered by far the best means of disposal whenever possible. Schedules of sewering, utilizing every available sewer opening, are made up as winter approaches. Sewer lines are inspected to see that they are flowing, and hose streams used when necessary to carry snow away. Careful attention is given to sewering, to avoid choking the lines, and to protect against traffic mishaps. Light snowfalls are often flushed into catch basins in above-freezing weather. Flushing and hydrant regulations fill two pages of the Manual.

Scattering, or the act of spreading piled snow out thin on pavements in the path of traffic, is utilized to hurry the melting process during thaws. Workers are warned not to spread snow too thick, or to spread ice chunks that would cause traffic hazard.

Instructions state that under no circumstances will snow be hauled from the streets in thawing temperatures where sewers are available for disposal. As a matter of economy, loading and hauling are considered to be tasks necessary only to remove accumulations from plowing large storms. The city's procedure, in summary, is to try salt, plowing, sewering, scattering and finally where necessary, loading and trucking away.

Hauling operations are divided into two organizations. First—Department hauling which consists of department loading machines and trucks

augmented by hired vehicles. Hired truck bodies vary in capacity from 8 to 23 cubic yards. Second—Contract hauling consists of a contractor who removes piled snow and ice from predetermined streets employing his own loading devices and trucks, under department supervision. The capacity of contract trucks range from 2½ cubic yards up. Average truck capacity is 15 cubic yards. Contractors are paid on the basis of cubic yards of snow and ice loaded and hauled to disposal point.

Piling for loading normally is not commenced until all cross-walks are cleared and car and bus stops cleared. Piles are made large, and are located on both sides of the street, as far apart as possible but not opposite each other.

### Parking Restrictions Needed

In New York City as in other cities large and small, the problem of parked and stalled cars has come into sharp focus. When a blizzard gets out of hand, the streets are blocked, and the experience of Christmas week suggests that new attention be paid to means of clearing arterials for plowing. Maybe more and heavier wrecker trucks, with more traction and winch and hoist power.

Curb-parked vehicles, however, are far and away the biggest headache, present every day all winter long. Magistrates in New York City have suggested to the police commissioner that they establish a 2-in. accumulated snow depth as the basis for taking cars off certain streets. This problem



★ New York suburban cities, too, had a time of it. Here a Trojan angle-dozer mounted on an International tractor is seen at work in New Rochelle, N.Y. This machine worked 16 hours a day every day from Dec. 26 to Jan. 4



★ Salting crews are the first to go out when icing begins to occur or snow is forecast

## All-Wheel-Drive Trucks a Boon

All-wheel drive, heavy-duty, big horse-power trucks, such as have been developed especially for snow removal, performed an important part of the work throughout greater New York area. All-wheel-drive trucks were used as wreckers in the Sanitation Division's program. The Triboro and Whitestone bridges and their approaches were kept clear and usable all through the storm by such equipment owned by the Triboro Bridge Authority. However, as the connecting roads and avenues and parkways were generally snowbound right after the storm, very little traffic could make use of these cleared bridges, according to one report. The

Board of Transportation of the City of New York also used all-wheel drive plows to keep their major bus routes open in the boroughs of Brooklyn, Queens and Richmond (Staten Island).

Similarly, heavy-duty snow trucks of older models (up to 20 or more years of age) served valiantly for the Fifth Avenue Coach Company, helping to tow their buses out of trouble. This firm purchased two new machines (Walter) to open up their routes on Riverside Drive, which had been closed during the storm. County and bus officials in the suburbs also demonstrated the usefulness, in fact, the vital necessity of this type of equipment following the big storm.

is simply one facet in the metropolis' great over-all problem of parking, and establishment of fringe parking areas such as the one in Flushing Meadows is a progressive step.

Radio appeals in the meantime have proved successful in getting owners to move their cars or take them home when a storm is starting. Radio networks have been cooperative.

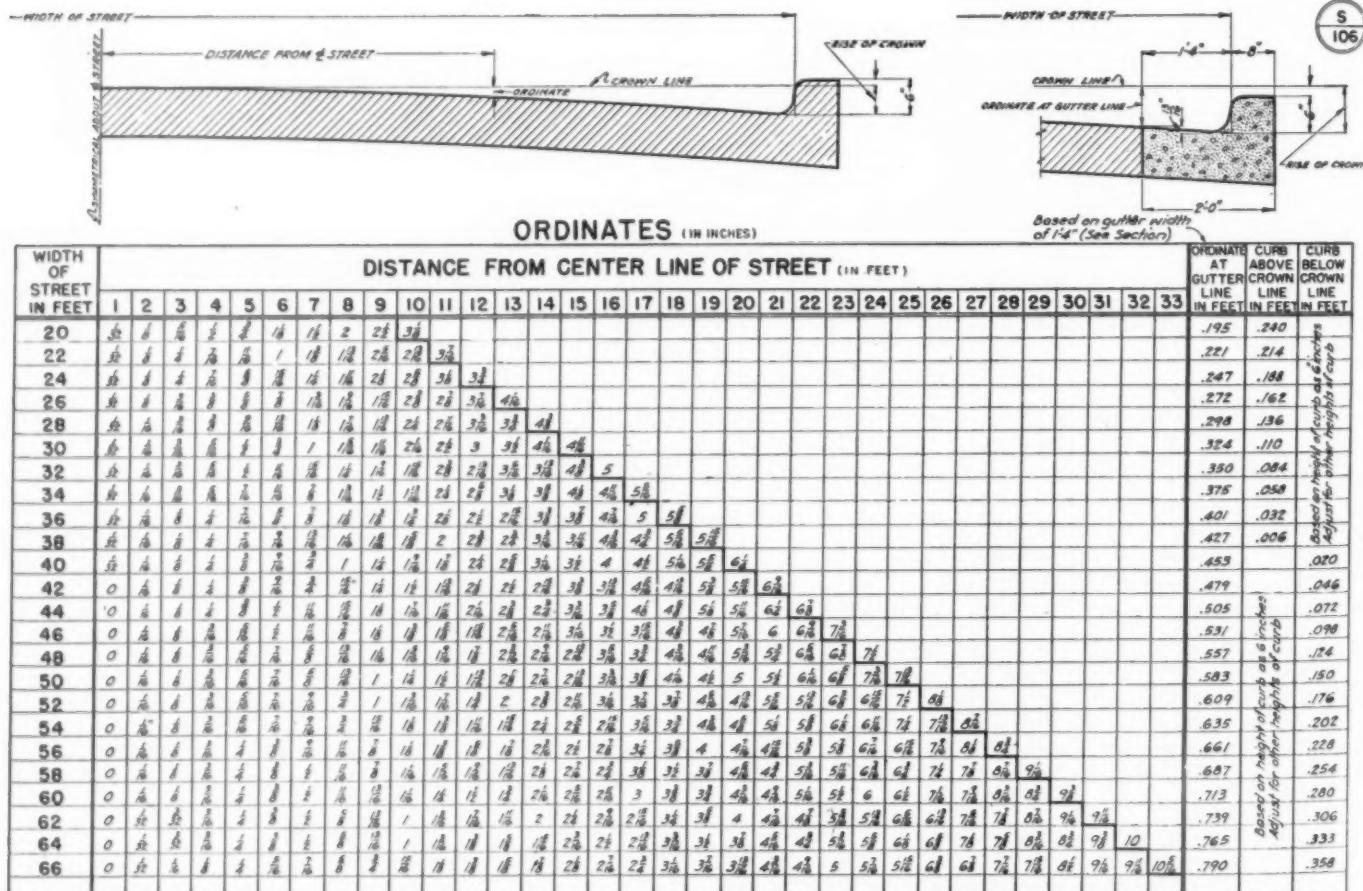
By way of summary, New York City officials feel, without being smug, that their snow plan and equipment fleet have come through well considering the severity of the winter. Their strategy—salt for light snow, plowing and hand-shoveling when needed, maximum sewerage, dispersion, minimum costly loading and hauling—will continue to be the basis of future winter planning. But tighter ordinances and better public cooperation on parking will be sought.

## Crown Ordinates All Pre-figured

How often engineers in the field wish that they had the detailed elevations all computed, so that pavement crowns can be staked out or checked on street work. W. W. Sanders, chief

engineer, Louisville dept. of public works, recently worked up such details on a plan sheet, reproduced herewith. The detailed ordinates and offsets may not conform to your city's pavement design details, but at least this sheet can serve as a model for preparing a similar sheet.

**Large Earthfill Dam—**Bids will be asked about April 30 by U.S. Bureau of Reclamation, Denver, Colo., for the construction of Cedar Bluff dam, an earthfill structure approximately 136 ft. high and 12,570 ft. long. Work includes 2,420,000 cu. yd. excavation, 8,000,000 cu. yd. earthfill, 47,000 cu. yd. concrete and 3,000,000 cu. yd. rockfill.



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★ Two planers worked in tandem. Second planer towed grader which shoved cuttings into widening trench. Motor patrol in rear used rear wheels to compact cuttings.

# Heater-Planer

## Used in Highway Widening

A FIFTEEN-MILE section of asphalt pavement on highway No. 91 near Blackfoot, Idaho, was recently widened and leveled. Subjected for years to heavy-duty truck and tourist traffic, its surface had become worn and dangerously rough in spots. Its 18-ft. width was no longer adequate. Removing ruts and irregularities by the use of a pavement planer was a basic step in the improvements.

Carl E. Nelson Co. of Logan, Utah, the contractor, sublet the planing and edge rolling to Pavement Planing Co. of Salt Lake City. At a contract price of 12 cents per sq. yd. for planing and rolling, this process was considered to be cheaper than using a leveling course in removing irregularities. The typical cross section shown illustrates the manner in which the Idaho highway department planned the work so that removing a minimum amount of surface material resulted in a satisfactory pavement and provided part of the bituminous material needed for widening.

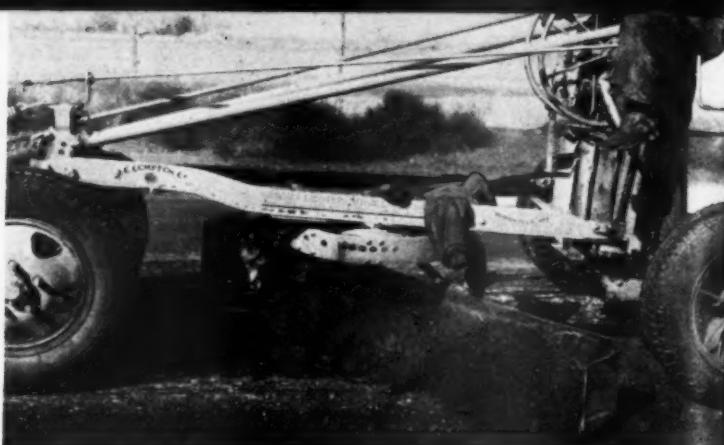
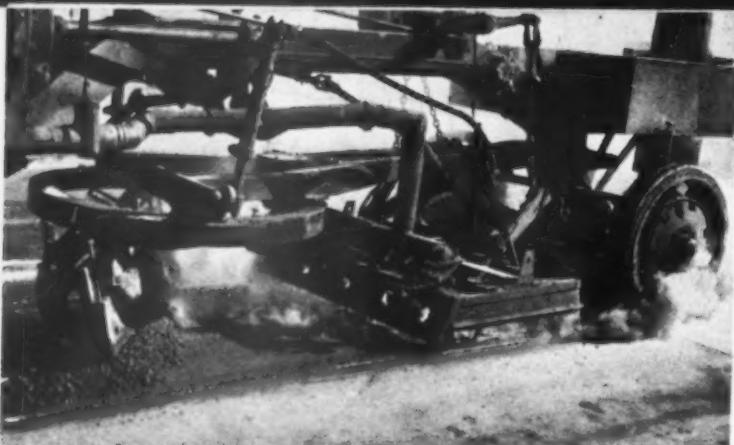
### Patrol Grader Carries Furnace and Planer

As is shown in the accompanying photograph, the planing equipment consisted of a pavement-heating furnace and special cutting blade mounted on a Caterpillar motor patrol. The outfit weighs about 15 tons, which was enough weight to prevent side slipping of the equipment when taking a heavy cut. The planer blade is of special

Bituminous material planed away and salvaged for use in construction of widening strips



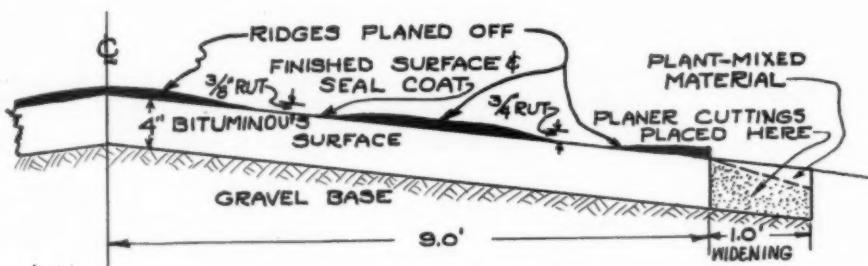
★ (Upper): Level rod shows depressions caused by traffic load in one lane of 18-ft. highway pavement. (Note pocket watch.) (Lower): Level rod illustrates how planing removed ridges and filled widening trench about 75% full. Plant-mixed material was used to fill balance of widening section



★ (Left): Closeup of planer shows pavement heater with 5 jets placed ahead of special cutting edge. Square tank on front of planer held water used to cool tire on specially constructed front wheels. Smoke stack is removable and used mostly on city work. (Right): Grader is shown depositing cuttings in widening trench



★ Trench 12 in. wide and 4 in. deep was cut in gravel shoulder to receive cuttings from planing operation



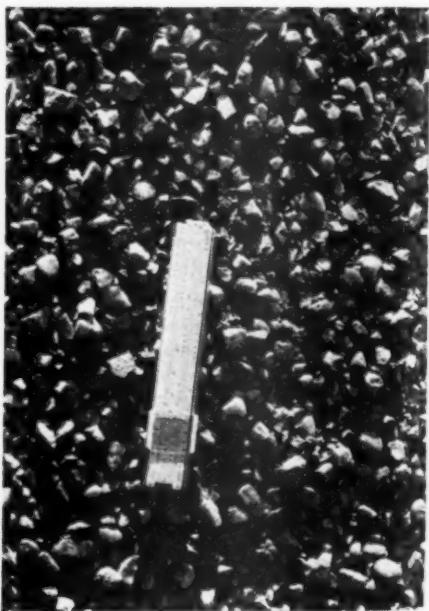
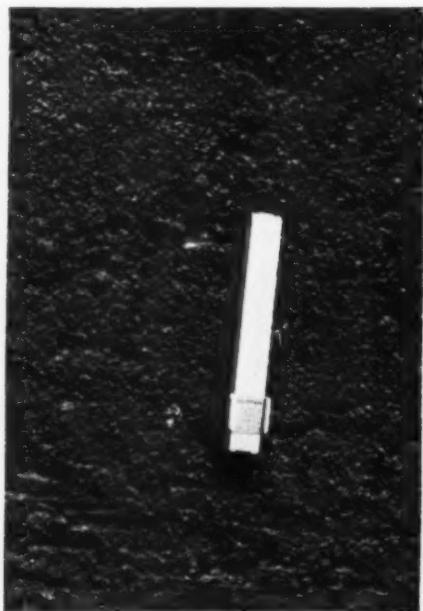
#### TYPICAL SECTION

★ Cross section shows how original 18-ft. pavement was widened to 20 ft. Additional 1 ft. of widening was subsequently added, using plant mixed material

carbon steel having a 560 Brinnel hardness. The blade is purposely thin to insure its retaining a square edge as it wears down. Thicker blades were found to have a tendency to become rounded. While 6 ft. in length, the blade was set at an angle such that it actually cut 4½ ft. Rate of travel varied between 30 and 35 ft. per minute. Water was dripped continually

on the front wheels to keep them cool. Power take-off at rear of patrol ran the fuel pump and blower. The furnace was lined with about 1 ton of castable refractory clay.

Except in places where fat spots were encountered, the furnace heat apparently had little effect on the asphalt pavement. The planed material  
(Continued on next page)



★ 4-in. slide rule illustrates extent of cracks before planing, and surface texture after planing, and again after seal coat and chips have been applied

# Tar Stabilized Roads

## Progress Report of ARBA Committee given at ARBA Conference, Washington, D. C., Jan. 27, 1948

By A. R. Taylor

Chairman of ARBA Tar Stabilized Roads Committee

THE Committee on Tar Stabilized Roads submitted a report at the 1946 ARBA convention in Chicago. The report, including specifications for Tar-Soil and Tar-Sand Stabilized Base Courses, was published in ARBA Technical Bulletin No. 104. As the Committee is working on a supplementary report, a brief outline of its activities to date may be of interest.

Since publication of the original report, the Committee has studied all available data relating to tar-soil stabilized projects and endeavored to set up simple requirements for determining the suitability of soils for stabilization with tar; requirements that may be determined by a minimum amount of testing and still give assurance of satisfactory stabilization. This would help organizations having little, if any, laboratory facilities or trained personnel to utilize this type of construction when suitable soils are available, and tend to discourage attempts to stabilize the less suitable soils not meeting the requirements.

### Sandy Soils Best

An inspection of tar-soil stabilized bases in the south revealed that those constructed with sandy soils had given satisfactory and economical service for periods up to 12 years, whereas those with heavy clay and silt soils had given various degrees of satisfaction, and had required considerably more maintenance than the sandy soil projects. Study of complete data relative to South Carolina's projects, revealed that on the more successful projects, the plasticity index of the soil did not exceed 15, the mica content more than 5%, and the clay-silt content (considered as material passing the No. 200 mesh sieve) not more than 50%. As a result of this study, additional data was collected relating to stabilization projects in other states. While not as comprehensive as that for projects in South Carolina, nevertheless it appears to confirm the conclusions drawn from

the work in South Carolina.

The tests used to determine the above three requirements are simple and easily made. In addition, they can be made in a reasonable length of time, which is not the case with many of the tests that have been used for tar stabilization. For this reason, they will permit more frequent sampling and testing of the sub-grade material, such as every 1,000 or 2,000 ft., or wherever there is an apparent change in the soil. If a soil does not meet the requirements, sufficient sand may be added and mixed with the soil until the requirements are met. If it is not economical to do this, stabilization should not be attempted.

The plasticity index of the soil is easily determined, as is a mechanical analysis of the soil to determine the percent of clay-silt (i.e. material passing a 200 mesh sieve), in that fraction of the soil passing a No. 10 sieve. While there is no standard test for determining mica content, the Committee proposes to recommend either one of two tests that have been used for this purpose. On the other hand, if a microscopic examination of the soil shows no evidence of mica, it is not necessary to run the test.

Data relating to the various stabilized projects indicates that soils meeting the above three requirements will assure satisfactory base courses if the soil is stabilized to a minimum depth of 6 in., with from 2 to 3 gal. of tar per sq. yd. Of course, proper construction methods must be employed and adequate drainage provided.

On new construction, soil meeting the three requirements may be selected for stabilization. If this is impossible, the available soil may be processed to a depth of 1 or 2 feet until it does meet the requirements. Old road surfaces present a more difficult problem as the addition of selected material may have sufficiently improved the surface layer so that it meets the soil requirements, whereas the sub-grade soil is vastly inferior. Under such conditions, it is necessary to either process the sub-grade material or increase the depth of the

stabilized base to compensate for the lower supporting value of the soil in the sub-grade.

### Soil Requirements

In conclusion, the Committee on Tar Stabilized Roads recognizes that the cost of base stabilization warrants setting up soil requirements that will eliminate all questionable soils and give reasonable assurance that those soils meeting the requirements will provide satisfactory bases when stabilized with tar. This is necessary if stabilized bases are to be used to any extent by organizations not thoroughly versed in soil stabilization.

The Committee also recognizes that any set of requirements set up for determining the suitability of soils for stabilization will probably eliminate some soils that can be stabilized satisfactorily. This is justified if the soil requirements eliminate the use of unsuitable soils which result in partial or complete failure and tend to retard the development of soil stabilization. Stabilization of the more questionable soils can be attempted by organizations having adequate laboratory facilities and trained personnel. However, even then the chance for successful stabilization will be considerably less than when the soil requirements are met.

The Committee hopes to continue its study on soil requirements for tar stabilization and be able to submit a supplementary report on the subject at next year's meeting.

### Heater-Planer Used in Highway Widening

(Continued from page 108)

remained in a workable state for some time. On the Blackfoot job it was bladed into a 1-ft.-wide pavement widening trench and immediately compacted to form as much of the widening material as possible. The rear wheels of the planer were of the right width and so were used to roll the planed-off material in place. Hot plant-mixed material was hauled in to finish the surface course.

The planer removed from  $\frac{1}{8}$  in. to  $\frac{1}{2}$  in., depending on the type of asphaltic material involved. When a sizable piece of coarse aggregate was caught above center the planer usually sheared it off. Caught below center a piece of aggregate was normally rolled out. The temperature of the planed surface immediately behind the planer was low enough to allow the hand to be held on it without burning.

The planed surface was sufficiently smooth and of such consistent texture that all remaining irregularities were corrected by the seal coat.

# Roller Bearing Maintenance

III—Concluding series on what your shopmen should know about roller bearing installation, replacement, etc. Published by permission from the Hyatt Roller Bearing Handbook

**F**LANGE type seals are used where a more positive type of closure is desired. They have as the sealing element, leather, asbestos, composition or other suitable material, usually shaped to form a wiping lip. This lip is held against the shaft at a constant pressure by means of a spring, and the whole assembled in a steel stamping. There are many variations of this basic design, such as double seals, felt and leather, or felt and composition combinations.

The mounting of flange type seals should be done with the greatest of care, as they are easily injured and their effectiveness can be destroyed through mishandling. In most cases, the seal is mounted with the wiping lip toward the bearing, and since the inside diameter of the seal is less than the shaft diameter, some difficulty may be experienced in starting the seal over the end of the shaft. All sharp corners and burrs over which the seal has to travel should be removed. A tapered or bullet shaped adaptor, recessed to fit the shaft chamfer, should be used to carry the seal over the shaft end.

If keyways or splines are present, the adaptor should be extended into a thin walled thimble which will cover the undercut section of the shaft and carry the seal to the smooth section. The seal is then mounted in the housing in the same manner and with the same care, as a roller bearing. A little oil or grease should be placed on the sealing element and the shaft lubricated to assist in mounting the seal. The seal should be moved along the shaft with a twisting motion to overcome friction. A thin coat of shellac applied to the outer surface of the steel stamping will assist in making the press fit more resistant to leakage.

### Gaskets and Shims

Gaskets are used to prevent leakage between mating flat surfaces, and

may also serve to adjust bearings. As they will become brittle with age and high temperature, gaskets should be renewed each time they are exposed for bearing inspection. The gasket should be fixed to one of the surfaces by a thin, even coat of shellac, and permitted to dry before the parts are fastened together. Loose gasket material or frayed edges should be trimmed before assembly to prevent particles from getting into the bearing or into the lubricating system. Shims, either metallic or fibrous, should be examined with each bearing inspection. They should be cleaned, and if damaged in any manner which might affect bearing adjustment, should be replaced or repaired.

### Lubricating Devices

Lubrication plays such an important part in prolonging the life of roller bearings that every precaution should be taken to insure perfect functioning of all lubricating devices. This means that all channels for the flow of oil or grease must be cleaned thoroughly, oiling devices checked,

and filters renewed if necessary. With grease lubrication, the vent holes should be checked, as pressure gun greasing may cause overlubrication. Where felts or wicks are used in lubrication, they should be cleaned or renewed as often as conditions require. Any arrangement designed to maintain a constant oil level should be checked from time to time to make sure it is functioning properly.

### Keys, Splines and Grinding Reliefs

Keys, splines and grinding reliefs should be cleaned carefully during any bearing inspection or replacement. Dirt becomes trapped in these recesses and corners, and when washed free by the lubricant can become a source of bearing damage. New machine parts having keys, splines or grinding reliefs should be thoroughly washed with a petroleum solvent to remove any grinding or lapping compound that may still be present.

Threaded sections should also be carefully cleaned before assembly. The nut used on the thread should be run-up before assembling the bearing

### For Longer Bearing Life—REMEMBER!

1. Make sure that shaft seat and housing bore are clean, smooth and of the correct diameter.
2. Do not remove bearings from package until ready for assembling.
3. Lubricate the surfaces of the bearing and machine part which are to be press fitted.
4. Start bearings on shaft with rounded corner radius of race going first.
5. Direct the driving pressure directly through race to be press fitted, making sure that pressure is directed straight and square.
6. Never hammer directly on races or rollers, and never use a wooden or soft metal mallet, as chips or splinters may enter the bearing.
7. Use many smart, quick taps rather than a few heavy ones.
8. Have straight, square ends on driving accessories and fixtures.
9. Drive races solidly up against shoulder of shaft and housing.
10. Clean tools, clean hands and clean surroundings are essential if damage to any bearing is to be avoided.

on the shaft. Thus, if the threads have been improperly cut, or are damaged, they can be repaired without the necessity of removing the bearing from the shaft.

### Snap Rings

Snap rings are very often used to retain bearings and races which are not secured by a heavy press fit. The snap ring groove should be cleaned to remove all possible dirt and to insure a firm seat for the ring. The snap ring should be ground or turned flat and be free from burrs and sharp edges. It should also be shaped so that it fits the groove snugly, not being of such diameter that it bulges, nor twisted so as to present an uneven surface to the bearing face. The snap ring ends should be of such design as to permit the ring to be removed easily from the application.

### Washers and Cotter Pins

Washers should be flat and true to prevent distortion of the bearing when adjusting the assembly. They should be free from burrs to avoid scoring the shaft, or indenting the bearing by breaking off and circulating with the lubricant. Cotter pin holes should be cleaned with a stiff piece of wire to remove old grease and dirt. The cotter pin should be replaced after having been used once because repeated bending will weaken the legs and allow them to break while in operation.

### Idle Machinery

Bearings installed in idle machinery are likely to corrode unless protective measures are taken. Where possible, the bearings should be removed and stored in the manner described. Otherwise, they should be thoroughly coated with a light bodied grease, as ordinary lubricating oil will drain off in time, exposing the finished surfaces to corrosion. In some cases, it may be possible to run the machinery for short intervals periodically, and in that manner redistribute the lubricant throughout the bearing. The frequency with which that should be done depends on local conditions, as some atmospheres may be more corrosive than others.

### Selecting Lubricant

Theoretically, roller bearings require no lubrication as the amount of friction developed by a roller moving over the surface of a race is very small. Practically, however, the lubricant serves several purposes. These are: to preserve the polished operating surfaces from corrosion; to act as a cooling medium; and to lu-

briate the rubbing surfaces between rollers and separators and flanges.

The selection of lubricants for roller bearings is based on four things which, in the order of their importance are: the type of bearing housing, the operating temperature, the speed of bearing rotation, and the particular requirements of the bearing type.

In all cases, the best guide for the proper selection of a lubricant is the recommendation of the manufacturer of the equipment in which the bearing is being used.

To the serviceman, the type of bearing housing is important because its construction will determine whether oil or grease is to be used as a lubricant. If the housing is water tight, a sodium soap grease can be used, whereas a calcium soap grease is necessary if there is danger of moisture affecting the lubricant.

In general, the viscosity of the lubricant must be increased as the temperatures at which operation takes place are increased. This factor may influence a choice between grease and oil. Extremes of temperature may require special lubricants, as low carbon residue oils for high temperatures, or paraffin-free oils for low temperature.

It is desirable, as a general rule, to use lubricants of lower viscosities for higher speeds, and vice versa. Greases have been found to be more suitable than oils for bearings operated at very slow speeds or where reversing or intermittent operations are encountered. With high speed operation, the greatest danger is that the lubricant will "churn" or foam, thus raising the operating temperature as well as reducing its lubricating value. Greases used for high speed operation must be selected for their ability to cling to rapidly-rotating parts. For any particular application, the type of roller bearing will have little influence upon the selection of the lubricant. However, roller bearings which do not have a separator to retain the rollers—that is, full complement or cage type bearings—are difficult to lubricate with grease, as they leave little room for penetration between the rollers. Also, flanged type bearings used for carrying light thrust loads require lubricants of slightly higher viscosity.

### Cleanliness in Lubrication

Cleanliness is of the utmost importance because the lubricant comes into intimate contact with the operating surfaces of the bearing, and consequently can be the greatest single factor in causing roller bearing failure. In order to insure operation free

from damage by the lubricant, the following rules should be observed:

1. Use only clean, fresh lubricants when refilling the oil or grease reservoir, especially after dismounting and cleaning the bearing.

2. With grease lubricated bearings, the grease should be completely removed, the bearings and housing washed thoroughly, and fresh grease added, at frequent intervals.

3. With oil lubrication, the oil should be drained, the bearing and housing washed or flushed with flushing oil, and fresh oil added, at frequent intervals.

4. Avoid the use of graphitic lubricants and oils which form large sludge or gum deposits.

5. Keep lubricants in waterproof and dustproof containers.

### Compounded Lubricants

Compounded lubricants consist of a straight mineral oil base, with sulphur or chlorine compounds added to produce greater lubricating ability. These oils are used in cases where extreme pressure between moving parts exist, as in hypoid gear tooth action. They have a tendency to form heavy deposits on bearing parts, especially where operating temperatures may be higher than normal. With bearings operating in compounded lubricants, particular care should be taken to follow the instructions of the equipment manufacturer regarding flushing and relubrication. When one type of compounded lubricant is removed from an application, another type should not be used as a replacement until the bearing and entire housing have been thoroughly washed, as the additives in the two lubricants may have a detrimental chemical reaction.

### Repair of Equipment

Of interest to public works engineers and particularly to equipment repair supervisors is a recent completed report on "Repair of Sanitation and Highway Equipment" by the Bureau of Municipal Research of Philadelphia. Although the study leads to recommendations for repair of sanitation and highway equipment in Philadelphia, most of the report is applicable to other types of mechanical equipment and to other cities. The analysis includes observations in 11 large cities: New York, Chicago, Philadelphia, Detroit, Cleveland, St. Louis, Pittsburgh, Washington, Milwaukee, Minneapolis, and Newark. While available, copies of the report may be obtained from the Bureau which is located at 311 S. Juniper Street, Philadelphia 7, Pa.

## NEW EQUIPMENT AND MATERIALS

### New Construction Equipment and Materials

1

#### Mobile Lube Depot

The Trail-Luber, a mobile lubrication depot for big construction machinery is now being marketed by Industrial Division, Gray Co., Inc., Minneapolis, Minn. Included on the unit are: a two-compartment hopper for pressure lube and gear lube; two air-operated pumps; two 20-ft. lubricant hoses with suitable adapters; one 25-ft. air hose with airline coupler, tire chuck and blower valve; a Briggs & Stratton "A" heavy duty engine, rated



New Graco Trail-Luber

1½ hp; and an air compressor with a 15-gal. storage tank, which delivers 7 CFM. Two Trail-Luber models are available. One is skid-mounted, for easy mobility on pick-up truck, or for stationary mounting on dock or similar platform. The other, easily pulled behind car, truck or tractor, is mounted on automotive-type wheels with pneumatic tires, and has a tongue, tongue stand and trailer hitch.

2

#### New Generator Sets

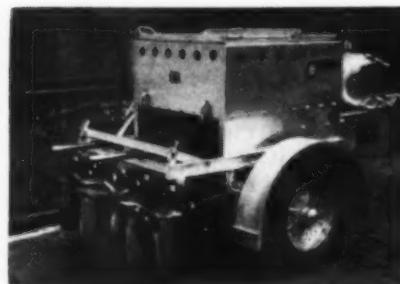
A new line of industrial gasoline engine electric generator sets has been announced by The Buda Co., Harvey, Ill. The 23 sizes and models are available in DC or AC output, single or three phase and in sizes from 10 KW to 125 KW. Each set is

complete and fully equipped with controls, generator, radiator, and engine all mounted on a self-contained base. Gasoline engine (also available with natural gas and butane engines) is water cooled and compactly built. Full circulating pressure system of lubrication is provided to all crank-shaft bearings, camshaft bearings, rocker arm bearings, and rocker arm shaft. Equipment on engines includes electric starter, lubricating filter, and air cleaner. Generator is direct connected, single ball bearing heavy-duty, drip-proof construction, and conforms to A.I.E.E. and A.E.M.E. standard. Control panel is complete with voltmeter, ammeter, circuit breaker, rheostat and engine controls.

3

#### Tool Heaters

Two models of new improved tool heaters have been announced by Littleford Bros. Inc., Cincinnati, O.



Model 90-AC Tool Heater

Model 90-X tool heater consists of highly portable two-pneumatic tired running gear with automotive type springs. The heating compartment

contains a ribbed cast iron liner on each side and bottom; this facilitates sliding of tools and allows the heat to circulate underneath each tool. Heat is supplied by two Littleford vaporizing torch type burners each capable of producing 2200°F. Directly above the tool heating compartment is a grill arrangement for heating pouring pots or buckets. Model 90-AC Tool Heater is of the same construction as the 90-X, but directly above the heating compartment is a 50 gal. capacity kettle for heating asphalt or tar, with a draw-off cock at the side with sufficient length to fill a pouring pot resting on the ground. When the tool heating compartment is used, cast iron liners isolate the kettle from the heat, when the heat is to be applied to the kettle, the liners are pulled into the out position and the heat is utilized for the tools and the kettle.

4

#### New Power Mower

A new power mower announced by Reo Motors Inc., Lansing, Mich., is claimed to be able to cut closer to highway sign posts, culvert and walks, guard rail posts, trees and other barriers. The mower is available in 2 models, 21 in. cut having a



Trimlawn Power Mower

cutting capacity of 3 acres per day, and 25 in. cut with a capacity of 4 acres per day. Both models feature

#### Mail Inserted Card

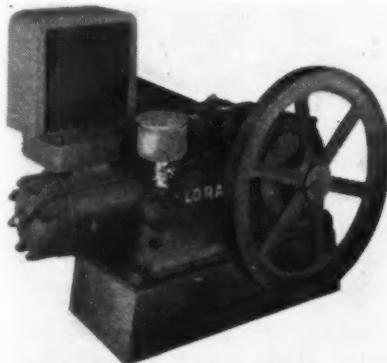
For data on equipment described on these pages.

a simple, convenient lever near the handle for instant, selective control of the cutting unit and tractor so that either one or both may be put in operation or stopped with just a flick of a finger while the engine is running. A sturdy 1½ h.p. engine powers both models. A flexible "knee action" mounting on the tractor, developed by Reo engineers, allows the cutting unit to follow the ground contours more closely thus providing a more even cut and giving the grass a more attractive appearance. This unit, riding on narrow skids, does not press down uncut grass.

## 5

### New Engine

A new Lorain Type "O" single cylinder, horizontal type, 2-cycle multi-fuel engine has been announced by White-Roth Machine Corporation, Lorain, O. The new engine, manufactured as a companion power plant to the current Lorain Type "L", is rated at 34.3 h.p. @ 450 R.P.M. It has a 9½" bore and 10" stroke with Timken bearings on crankshaft and crosshaft. Wet-sleeve type cylinder liners are of alloy cast iron. The en-



New Lorain Type "O" Engine

gine may be operated as a cold starting, full diesel or converted to burn natural gas or butane as fuel. Conversion is easily accomplished in the field. Condenser type cooling system eliminates need for water pump and makeup water is negligible. Standard equipment includes Twin Disc clutch, Pierce governor, Air Maze oil bath type cleaner, McCord lubricator.

## 6

### Crankshaft Hone

A crankshaft hone announced by McGee Sales and Service, Wenatchee, Wash., is an easy to operate hand tool for removing scores, ridges, taper from worn crankshafts without removing the shaft from the engine. It

is stated that mechanics have proven that they can remove ridges up to one thousandths (.001) per minute. Using a micrometer for accuracy a mechanic can cut a worn crankshaft to fit the desired undersize insert. Mechanics use this hone as a precaution against ill-fitting connecting rods and inserts. This tool is adaptable for use away from the shop. It can be carried in the cab of the truck just as easy as a tire wrench. There is no additional machinery needed, so it is claimed a truck driver can put in new rods and inserts away from the shop.

## 7

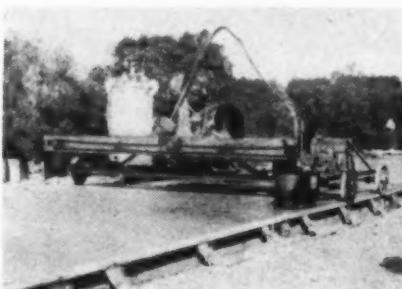
### New Electrode

A new electrode announced by All-State Welding Alloys Co., Inc., White Plains, N.Y., can make machinable electric welds on cast iron at amperage in the 45-140 range. This electrode has a nickel core and is highly recommended for use on cast iron wherever free machinability and perfect color match are required. One of its outstanding features is its freedom from spatter. It is especially recommended for the repair of cylinder heads and motor blocks because of the low amperage required and the ductility that is obtained in the weld. This electrode, known as All-State No. 4 fully machinable cast iron electrode, can be used on either A.C. or D.C. and is obtainable in diameters of 3/32-, 1/8-, or 5/32-inch.

## 8

### Automatic Spray Machine

A completely automatic spray machine for applying membrane curing material to concrete pavements has been announced by Flex-Plane Co., Warren, O. A single nozzle machine, riding on the forms, it is fully equipped to apply material uniformly



Automatic Spray Machine on Ohio Road Job

and without waste. Exclusive features claimed for this machine are its fully automatic operation, including remote control start and stop attachment; its method of double spraying each square

foot of concrete; the single, external mix type spray gun, which does not foul or drip; a 60 gal. constantly agitated pressure tank; and the forced-feed system of refilling the pressure tank. The machine is available in standard widths, 10-12.5 ft. and 20-25 ft.; and in special widths on request.

## 9

### New Rock Drill

A new self-propelled rock drill, announced by Ingersoll-Rand Co., New York, N.Y., is stated to drill a hole up to 6 in. in diameter and up to 70 ft. in depth. Known as the Quarrymaster, this machine is a completely self-contained unit consisting of a



Quarrymaster Rock Drill

dull, compressor plant, propulsion equipment and accessories. The air-operated piston-type drill is stated to strike more than 200 blows per minute. A patented valve action and power cycle is stated to insure maximum efficiency and drilling speed, while maintenance is reduced to a minimum by utilizing a cushion of air to bring the piston to rest before it can strike the front head. Feeding of the drill is accomplished by an air motor which drives the feed chain. A conveniently located throttle allows the operator to exert accurate control over the drill feed. A drill-steel cen-

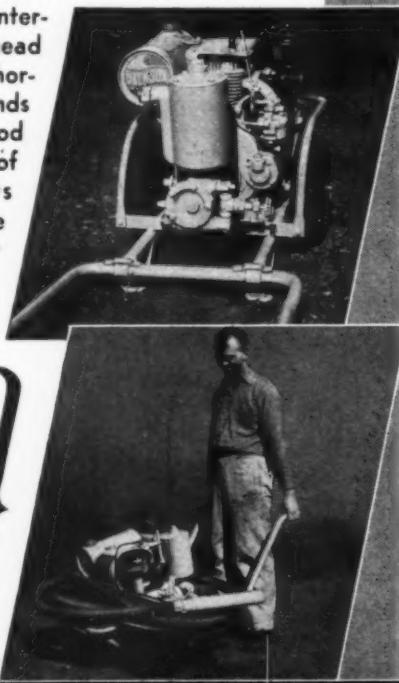
# The JACKSON Hydraulic



## THE INDEPENDENT CONCRETE VIBRATORY UNIT *Contractors SWEAR BY (Never at)!*

For downright reliability and trouble-free service, as well as the ability to do a perfect job of vibrating concrete on a wide range of construction, the JACKSON HYDRAULIC is tops. There are no troublesome parts to break, and as all moving parts run in oil there is no lubrication problem. Amplitude and frequency, the factors so important to proper vibration of concrete, have been correctly balanced with careful regard to the diameter of the vibrator head. Frequency is adjustable from 4000 to 7000 V.P.M. through throttle of the highly dependable 5 H.P. Wisconsin engine. 34 ft. flexible handle gives a satisfactory operating range for all jobs. Wheelbarrow mounting makes the entire assembly easily portable. An interchangeable grinding and drilling head is available and easily attached. Thoroughly proved in the hands of thousands of contractors, this machine has stood the test of time and represents one of the very best equipment investments any general contractor can make. Write for the complete facts or see your JACKSON distributor.

**FOR EACH AND EVERY TYPE OF CONCRETE CONSTRUCTION** the JACKSON line contains a vibrator that will give you the best possible job at the minimum of labor and maintenance cost — electric, engine-driven flexible shaft and Hydraulic models; internal and external types. Drop us a line for the best solution to any vibrating problem.



**ELECTRIC TAMPER & EQUIPMENT CO.**  
LUDINGTON MICHIGAN

tralizer guides the drill steel until the bit is well-started permitting quick and easy collaring of holes in the most uneven ground. In drilling, the bit is automatically rotated by a mechanism which turns it into a fresh cutting position for each blow. The amount of rotation is controlled so that the bit will cut with maximum efficiency. Air is supplied by an Ingersoll-Rand KA-500 Mobil-Air compressor mounted on the Quartermaster frame.

## 10

### New High Speed Radial Saw

A new high-speed radial saw has been announced by the Porter-Cable Machine Co., Syracuse, N. Y. The new radial saw, model RS, is powered by a compact, light weight motor, available in one or two horse power



Model RS on Bevel Ripping Operations

ratings. The motor operates dc/ac 25 to 60 cycles with a spindle speed of 8000 rpm. The compactness of the motor accommodates a 12 in. saw blade, cutting a full 4 in.; thus, a number of 2 x 4's can be laid on a table and cut off in gangs. Model RS is adaptable for cross cutting, gang cutoff, angle cutoff, bevel cutting, compound 45° cut, dado cutting and ripping operations. The motor unit is set vertically to accommodate cope heads, shaper heads, dado saws and groovers.

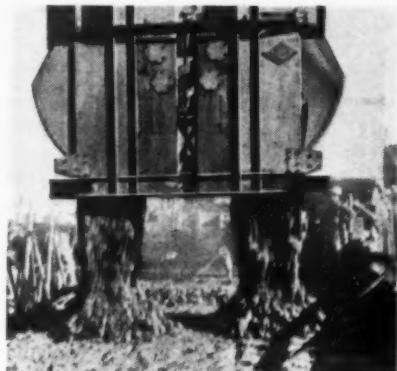
## 11

### New Type Concrete Bucket

A new type of concrete pouring bucket developed in 1947 to meet new requirements of the U. S. Engineers is now in production by Blaw-Knox Co., Pittsburgh, Pa. The new design presents a rectangular bucket with air operated roller gates and controllable discharge. The larger sizes are dual

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units formed by coupling together two buckets and this compartmentation permits placing the concrete in two piles without decreasing the rate of production. The Blaw-Knox Co., is now in production on the new design



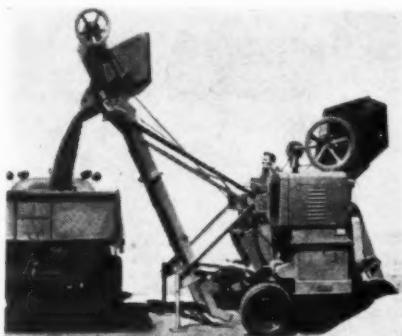
Showing Discharge of 8 cu. yd. Bucket into Two Separate 4 cu. yd. Piles

of rectangular concrete bucket equipped with air operated discharge gates in the following sizes: 2 cu. yd., 3 cu. yd., 4 cu. yd., Dual 3 cu. yd. to make a 6 cu. yd. unit, Dual 4 cu. yd. to make an 8 cu. yd. unit. The accompanying illustration shows the original 8 cu. yd. test bucket which was designed and built for the demonstration at Allatoona and Wolf Creek Dams. The view illustrates the discharge of the bucket into two separate 4 cu. yd. piles. Some structural design changes have been made for the production buckets, but these do not alter the main characteristics of the bucket design.

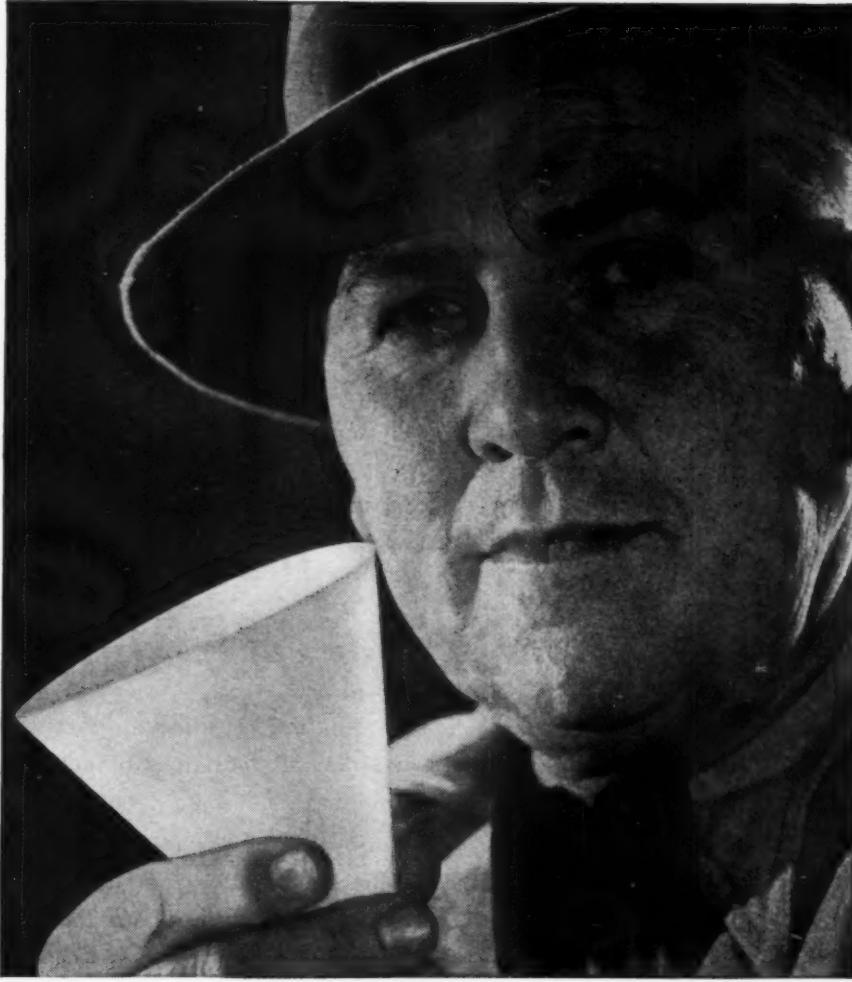
## 12

### Tower Attachment for Bituminous Mixers

A special tower attachment for discharging bituminous mix above ground level has been introduced by Kwik-Mix Co., Port Washington, Wis. Adaptable to either its 10 cu. ft. or 14 cu. ft. standard bituminous mixer, the Kwik-Mix tower attachment answers the problem of loading bituminous material from a ground level mixer into trucks or for stockpiling.



Tower Attachment on Kwik-Mix Mixer



**"Our labor relations are smoother  
since we use  
VORTEX CUPS"**



#### NEW DIXIE PORTABLE WATER CARRIER

Well built for hard use in the field. Insulation keeps 4 gals. cool for hours. Write for descriptive folder. Dixie Cup Company, Easton, Pa.

Take it from 'supers' who have tried it out, there's less grumbling . . . fewer complaints . . . more time saved . . . with Vortex\* or Dixie\* Cups on the job alongside the men. By placing a cool, clean drink within easy reach, you provide an extra health safeguard—besides showing a spirit of cooperation that pays off.

\*"Dixie"  
is a registered  
trade mark of the  
Dixie Cup Company  
REG. U. S. PAT. OFF.

Discharge height is 7½ ft. for the No. 10 and 8½ ft. for the No. 14. Operated by a special hoist, the loader is fully controlled by a single lever located on the operator's platform. The hoist is mounted within mixer frame and powered by the mixer motor. Hoist clutch is disengaged automatically when bucket reaches discharge position.

### 13

#### New Paint for Concrete

A new heavy-duty, long wearing synthetic paint, that is claimed to pro-

tect concrete surfaces with an abrasion-resisting coating that does not check, crack or "dust" has been introduced by Lowebo, Inc., Chicago, Ill. The new paint is stated to dry to a hard, durable, glossy finish in three to four hours and to seal concrete surfaces from moisture above or below. It expands and contracts easily with the surface covered and resists acids, alkalies and extreme degrees of heat or cold. Besides forming a protective covering on concrete, the new synthetic paint can also be applied to exposed metals, machinery, boilers and pipes and to porous masonry surfaces.

## DESIGNED ON THE JOB for "UNDER FIRE" duty

**Marion Bodies and Hoists are no "drawing board dreams."**  
They are designed by field-experienced Marion engineers to meet the fire of actual work conditions.

Regardless of how rough or tough your loading, hauling and dumping problems are . . . there's a Marion Body designed on the job to fit your particular need. Write direct, or to your nearest Marion Distributor, for literature, prices and information.

*General purpose body. Removable side and rear corner posts for quick converting to platform type body.*



# MARION

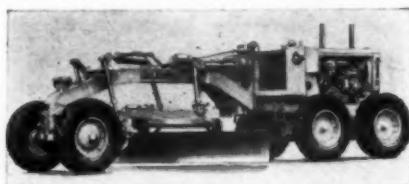
DUMP BODIES and  
HYDRAULIC HOISTS

MARION METAL PRODUCTS CO., MARION, OHIO

### 14

#### New Motor Grader

A new extra heavy motor grader, Model 116, has been announced by Galion Iron Works & Mfg. Co., Galion, O. A few of the outstanding features listed in Model 116 specifications are 100 H.P. diesel engine; weight range of 23,285 lb. to 25,050 lb., depending upon extra equipment; complete hydraulic control;



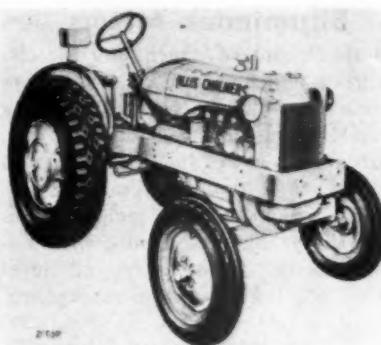
Model 116 Motor Grader

manual steering with hydraulic booster; all-gear tandem drive, 14.00 x 24 low pressure tires, both front and rear; eight forward speeds giving a range of 1.5 to 26.0 miles per hour. Model 116 is said to be designed and constructed to handle the heaviest and toughest kind of work. Precision controls permit grading to the most exacting specifications.

### 15

#### New Wheel Tractor

The new 1948 Model IB wheel tractor, designed for municipal and industrial use, now under production by Allis-Chalmers Mfg. Co., Milwaukee, Wis., embodies many improvements over a similar model produced before



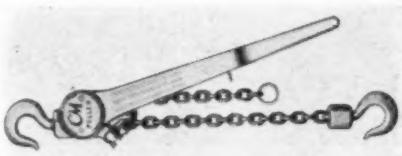
Model IB Wheel Tractor

the war. Engineered to provide mechanized service for all seasons of the year, the IB is a 2365 lb. 16.8 H.P. unit. It is powered by a medium speed water-cooled 4-cycle gasoline engine stated to use less than 1 gal. of fuel per hour on average work. The tractor has a wheelbase of 57 7/16 in. length of 97 1/2 in. and ample ground clearance under the front axle of 8 3/4 in.

16

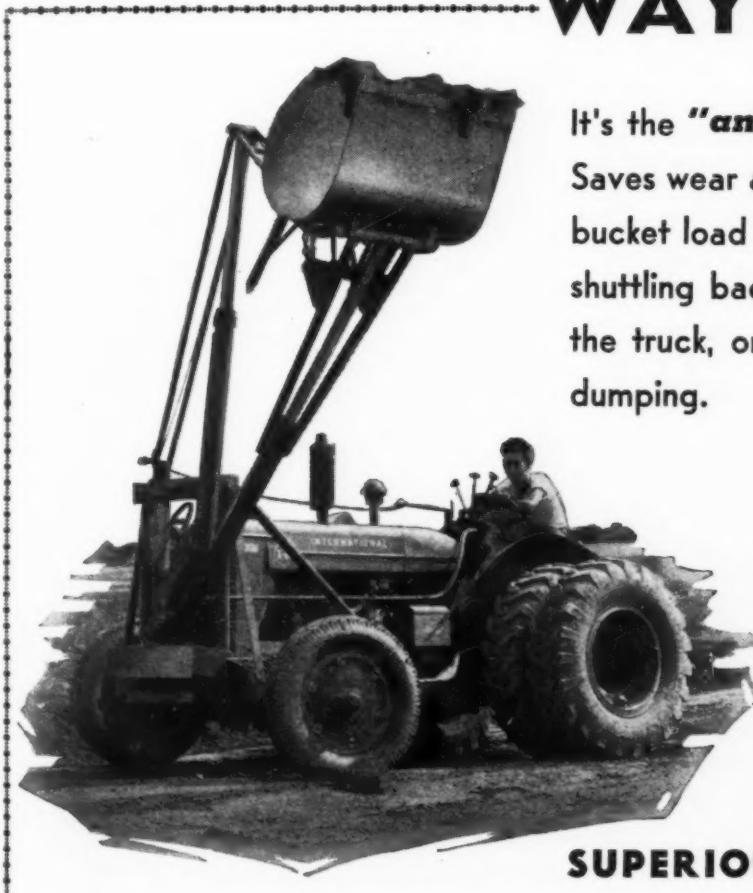
New Puller

A new, improved model of the CM puller, announced by Chisholm-Moore Hoist Corp., Tonawanda, N. Y., lifts and pulls from any angle. The new model is lighter and sturdier than its predecessor and has a more streamlined appearance. The  $\frac{3}{4}$  ton model weighs only 13 lb. It will lift or pull at any angle and eliminates slow and often dangerous makeshift methods.



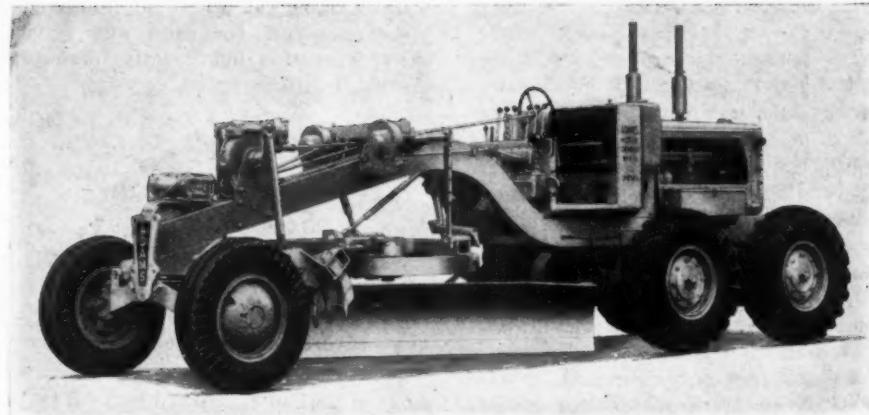
### **Improved Model CM Puller**

Design has been simplified so that fewer parts are used and a number of improvements have been made in the lifting mechanism and method of operation. Weight reduction has been accomplished through the use of aluminum alloy castings for the housing, cover and handle. The lift wheel and ratchet are of high carbon steel accurately machined and heat-treated to



## New 100 H.P. Motor Grader

The largest, heaviest, most powerful motor grader ever introduced by the Adams organization—the new, 100 h.p. No. 610—was previewed by distributors at the J. D. Adams Manu-



#### New Adams No. 610 Meter Grader

facturing Co. plant in Indianapolis just prior to the annual AED convention. The new No. 610, the result of the most extensive testing given any Adams Motor Grader, had its first field tests in the summer of 1943. Since that time experimental machines have worked continuously under all types of conditions in all weathers with one machine alone rolling up over 4,500 hours of strenuous use. The production machines incorporate the findings of this 5-year test period. Powered by a 100 h.p. UD-16 International Diesel engine the grader weighs over 25,000

# **•WAY UP AND OVER**

It's the "***and over***" part that interests you, too. Saves wear and tear on equipment by swinging the bucket load to the waiting dump truck rather than shuttling back and forth with either the loader or the truck, or both. Swings 90° to either side for dumping.

*It's a SUPERIOR Swing Loader*

- Full hydraulic, convenient controls
  - Rear of tractor free for other work
  - Excellent visibility
  - Mounts on International Harvester Industrial Wheel Tractor, I-6, Heavy Duty, or ID-6, Heavy Duty
  - Sold through International Harvester dealers

# **SUPERIOR EQUIPMENT COMPANY**

**BUCYRUS, OHIO**

lb. without accessories. With over 18,000 lb. on the rear wheels ample traction is provided to make full use of the 100 h.p. engine. Exceptionally easy operation is made possible by the use of a combination mechanical-hydraulic steering mechanism. Other outstanding features of the new machine include the Adams full-floating rear axle (axle drives machine only—carries no weight); a 12 ft. blade 31 in. wide; 8 forward speeds ranging from 2.6 to 25.2 m.p.h.; hydraulic brakes on all 4 tandem drive wheels; 14.00—24 tires on tandem and 11.00—24 tires on front wheels for better traction and flotation; a new two-piece cab that provides 6 ft. 3½ in.

inside cab height and new, improved power controls that not only give easier operation but greatly increase the blade lifting speed.

## 18

### Improvements on Scoopmobile

Standard equipment on the 1948 scoopmobile, a product of Mixermobile Distributors, Inc., Portland, Ore., is a new reversing and reduction gear box providing additional gear reductions of 3.01 to 1 forward and 2.5 to 1 reverse. Flexibility of the machine has been increased by means of the

new gear box which permits the pre-selection of four operating speeds in either direction, and the reduction of forward speed to less than 100 ft. per



The Scoopmobile

minute. This latter factor permits the synchronization of forward travel with the speed of the closing action of Scoopmobile's bucket. The gear box, using a steel fabricated case with case-hardened, precision gears, is constructed to stand up under continuous heavy duty operation. The unit weighs 150 lb. Available also as an accessory to existing Model B. Scoopmobiles, the new reversing reduction gear box may be purchased for installation in dealer approved shops.

## 19

### Improved Model Tractor Shovel

The Frank G. Hough Co., Libertyville, Ill., has announced an important improvement in their Model HF ¼ cu. yd. Payloader tractor shovel. Previously equipped with hydraulic lift and lowering of the bucket, the machine now has the added feature of hydraulic bucket control which dumps and closes the bucket by fingertip actuated hydraulic power. Bucket can be dumped gradually or instantaneously as desired and can be closed immediately by the same hydraulic cylinder. This feature increases the speed and ease of operation because the bucket need not be dropped to ground and tractor reversed to close it. It also relieves the machine and the trucks being loaded of dumping shock and wear and tear.



Model HF ¼ cu. yd. Payloader Tractor Shovel

**Any of these authorized distributors will be glad to tell you more about the**

**Moto-Paver**



The proof of any paving equipment is in its performance. Moto-Paver, the complete traveling mixer and paver, has now been on the job for more than a year. The quality—and the cost—of the work it has done will make interesting reading for any paving contractor, highway official or engineer. A performance record, with typical cost table, will be sent on request. Address the factory, or see your nearest distributor listed below:

<b>ALABAMA</b> M. G. Williams Machinery Co. Montgomery	<b>MINNESOTA</b> George T. Ryan Co. Minneapolis 14	<b>SOUTH CAROLINA</b> S. C. Equipment Co., Columbia
<b>ARIZONA</b> O. S. Staples Co., Phoenix	<b>MISSOURI</b> Noel V. Wood Inc., Kansas City	<b>TENNESSEE</b> Choctaw Inc., Memphis Nixon Machinery & Supply Co., Chattanooga
<b>CALIFORNIA</b> Crook Co., Los Angeles Sears-Wells Co., Oakland 7	<b>NEBRASKA</b> O. B. Avery Co., St. Louis 10	<b>TEXAS</b> Fuchs-Clayton Machinery Co., Omaha 2
<b>COLORADO</b> Mine & Smelter Supply Co., Denver 17	<b>NEW MEXICO</b> Harry Cornelius Co., Albuquerque	<b>UTAH</b> J. K. Wheeler Machinery Co., Salt Lake City 1
<b>CONNECTICUT</b> W. I. Clark Co., New Haven 2	<b>NEW YORK</b> Harrod Equipment Co., Inc., Syracuse 4.	<b>VIRGINIA</b> Metlithany Equipment Co., Roanoke
<b>FLORIDA</b> Florida Equipment Co., Jacksonville 3	<b>KANSAS</b> Jaeger-Lembo Machinery Corp., Corona, L.I.	<b>VERMONT</b> Noble-Bellise Machinery, Inc., White River Junction
<b>GEORGIA</b> J. W. Grass Equipment Co., Atlanta	<b>ILLINOIS</b> Van's Equipment Sales Inc., Rensselaer	<b>WASHINGTON</b> General Machinery Co., Spokane
<b>ILLINOIS</b> A. E. Hudson Co., East Peoria	<b>NORTH CAROLINA</b> J. B. Hunt & Sons, Inc., Raleigh	<b>WEST VIRGINIA</b> Star Machinery Co., Seattle 4
<b>IOWA</b> Herman M. Brown Co., Des Moines 4	<b>OHIO</b> W. W. Williams Co., Columbus	<b>WISCONSIN</b> Charles S. Porter Supply Co., Huntington 11
<b>KANSAS</b> M. B. Salisbury Co., Topeka	<b>OKLAHOMA</b> Leland Equipment Co., Tulsa 1	<b>CANADA</b> W. T. Bayless, Milwaukee 11
<b>KENTUCKY</b> Sheppard & Bogie Equipment Co., Lexington	<b>PENNSYLVANIA</b> John W. Patterton Co., Pittsburgh 22	<b>ALBERTA: Armeo Drainage &amp; Metal Products,</b> S. Edmonton
<b>LOUISIANA</b> Southern States Equipment Co., New Orleans 11	<b>MARYLAND</b> Metalweld Inc., Philadelphia 29	<b>BRITISH COLUMBIA: B. C. Equipment Co., Vancouver</b>
<b>MARYLAND</b> D. C. Elphinstone Inc., Baltimore 2	<b>MASSACHUSETTS</b> Clark Wilcox Co., Boston	<b>MANITOBA: Howard F. Powell Co., Winnipeg</b>
<b>MASSACHUSETTS</b> Clark Wilcox Co., Boston	<b>MICHIGAN</b> Earle Equipment Co., Detroit 4	<b>ONTARIO: W. L. Ballantine Co., Toronto</b>
<b>MICHIGAN</b> EKS Equipment Co., Grand Rapids	<b>SOUTH DAKOTA</b> J. D. Evans Equipment Co., Rapid City	<b>QUEBEC: Laurion Equipment Co., Montreal 22</b>

**Hetherington & Berner Inc.**

721 Kentucky Avenue

Indianapolis 7, Indiana

"America's First Builders of Asphalt Mixing Equipment"

### New Weed Burner

A new push-cart type unit for getting rid of undesirable grass and weeds in inaccessible places has been announced by General Corporation, 823 Mercantile Bank Building, Dallas 1, Tex. Known as the Killall burner, this unit is a low-pressure, kerosene-burning outfit which burns 3 gal. of fuel per hour, with a 3-gal. tank. In addition to roadside and parkway maintenance, it is recommended for use by street departments in heating the surface of asphalt in connection with ironing and raking out wrinkles.

### New Apron Feeder

A new model apron feeder introduced by the New Holland Manufacturing Co., Mountville, Pa., features a new multi-plane throat designed to prevent odd-sized stones slipping into the neck and causing time-wasting jams. Designed primarily for use with the New Holland double impeller breakers, the Model 30 is also adaptable to most stone reducing units. Controlled feeding with the Model 30 is stated to be assured with a V-belt drive from motor to American reduction unit mounted on countershaft,



Model 30 Holland Apron Feeder

**CONCRETE Cured IN  
72 HOURS**

**Fulco  
COTTON  
Concrete-Curing  
MATS**

*Best-By-Test*

For a dependable job that will stand up for a uniform cure, that reduces possibility of cracks, Fulco Cotton Mats are days quicker and much cheaper than any other curing method. Fulco is favored and approved for State and Federal highway construction.

**Fulco MATS USABLE 50 TO 75 TIMES!**

Durably made of tough osnaburg, stitched edges and running seams 4" apart, a Fulco Mat can be used over and over again—50 to 75 times. Fulco Mats, filled with padding weighing 12 oz. per sq. yd., keep dripping wet longer with less water and are more efficient in insulating against temperature changes. Fulco Mats give you extra savings in cities where earth must be hauled in and out. And—the compressive strength of concrete cured by Fulton Mats is greater than that cured by any other method.

WRITE FOR SPECIFICATION AND PRICE LIST  
Address Nearest Factory Branch

**FULTON BAG & COTTON MILLS**

New Orleans  
Denver

St. Louis  
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Manufacturers Since 1870

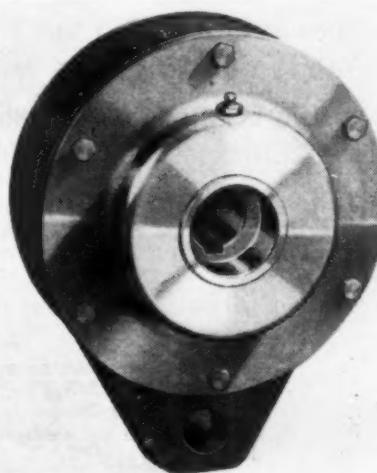
Dallas  
Minneapolis

Kansas City, Kans.  
New York

with chain drive between first and second countershaft and gear drive to apron belt. Five horsepower is required. The 4-in. pitch steel apron conveyor belt travels up to 20 feet per minute. There are  $\frac{3}{8}$  in. thick pans and dual roller carrier chains. Other features of the feeder are hopper plate thickness of one-half inch, anti-friction bearings, full steel drive gears and renewable wear strip at the lower edge of the hopper. Approximate weight of the Model 30 with drives is 7,000 lb.

### New Backstop Prevents 'Back-Run'

A new backstop, now under construction by The Falk Corporation, Milwaukee, Wis., is claimed to provide a positive method for preventing reverse rotation on conveyor drives, elevator head shafts, windlasses, winches and on all applications where reverse rotation should not occur. "Back-run" or reverse rotation, in some machinery operations, may cause serious damage to the machinery and the material being handled. In addi-



Falk Backstop

tion, expensive production delays may result. The gripping action of the Falk backstop takes place at the precise moment that forward rotation ceases. It reduces the possibility of shock or strain to a minimum. The present design and construction is based on 15 years of actual field experience.

23

### New Reinforcing Bar

A new form of reinforcing bar fabricated by the Webrib Steel Corporation in its plant at Danville, Pa. is stated to effect a considerable saving in the amount of steel required in re-

inforced concrete construction. Webrib bar is a deformed dumbbell shape produced by cold spiral bending and twisting an intermediate grade bar so as to increase its yield point by 50%. Thus, the yield point of ordinary intermediate grade steel is raised from a



Webrib Reinforcing Bar

specified value of 40,000 p.s.i. to a minimum value of 60,000 p.s.i.. The high bond strength inherent in the shape of the spiral bent bar is further

increased by the presence of transverse ribs, the height and space of which are calculated to balance their capacity in bearing on the concrete with the shearing strength of the concrete between the ribs. The equivalent sizes of the Webrib bar of comparable grade steel may be substituted in a structure on a bar for bar basis, without redesign. Each Webrib bar is individually tested as the process of spiral bending reveals hidden defects such as piping, seams and laps, which are causes for rejection. Webrib bars meet all bending test requirements for intermediate grade deformed bars and are fabricated without difficulty.

24

### New Asphalt Pumper

A pumping unit for unloading tank cars of asphalt, oil, or other thick materials has been placed on the market by the W. E. Grace Mfg. Co., Dallas, Tex. It is equipped with a 20 h.p. motor, a Grace 4-in. gear type



## BITUCOTE OFFERS DOUBLE SAFETY — NO HEATING and IT'S NON-VOLATILE

Open flames, heating apparatus, and laborers inhaling volatile fumes... Those are things of the past with no hot mix to overheat. No flash fires or explosion hazards exist in modern paving with Bitucote emulsified asphalt.

Bitucote Emulsified Asphalt is not alone labor-saving, it's labor-aiding—and SAFE TOO.

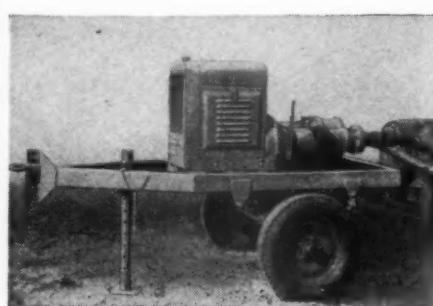
Applied without heat and mixed with local aggregates, Bitucote provides a hard but ductile, non-skid pavement at low cost.

**Bitucote**  
PRODUCTS CO.

1411 CENTRAL INDUSTRIAL DRIVE • ST. LOUIS 10, MO.  
Plants in Cincinnati, O. • St. Louis, Mo. • El Dorado, Ark.

Send for booklet "Pave It Better With Bitucote"

Get more of the advantages of asphalt with Bitucote Emulsion!



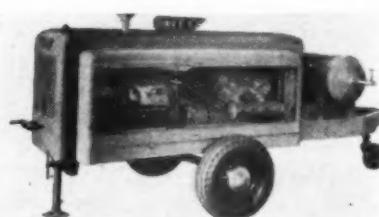
New Grace Asphalt Pumper

asphalt pump with built-in strainer, and is regularly equipped to deliver 275 GPM at 1800 engine speed. Higher or lower pumping rates are obtainable by sprocket changes. Unit is available on a trailer or on skids.

25

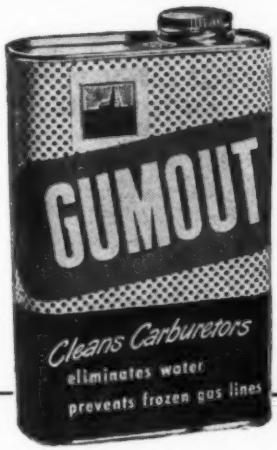
### New Compressor

Addition of a 160 c.f.m. 2-wheel trailer unit to its 1948 compressor line has been announced by Davey Compressor Co., Kent, O. The new unit will feature a 4-cylinder Davey V-type compressor and will be known as "Air Chief Model 160—2 wheel." Perfect chassis balancing will provide for the



New Davey Compressor

# Clean carburetors mean increased operating efficiency



## GUMOUT CLEANS CARBURETORS

- Eliminates gum damage
- Reduces carbon formation
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- Makes starting easier
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Want to rid your equipment of costly, annoying carburetor and fuel system troubles? Reduce down-time?

Want to eliminate gum damage in the fuel system . . . assure better fleet operation?

Gumout will do this—and more—for your gasoline-powered equipment.

One pint of Gumout to ten gallons of gas, once each month or every 60 hours of operation, dissolves harmful gum and foreign deposits . . . cleans and keeps clean carburetor, fuel pump and fuel lines. Composed of 100% active ingredients . . . pure undiluted solvents, Gumout works fast and sure.

Penn Drake Gumout also absorbs moisture present in gas tanks and fuel lines. Gumout is supplied to equipment operators in 5 gal. pails; 15, 30 and 55 gal. drums. Sold in pint cans by retail outlets everywhere.

**Use Colonel Drake Heavy Duty Oil in your heavy duty equipment. Colonel Drake is detergent and fully dispersive . . . refined from 100% pure Pennsylvania Crude.**

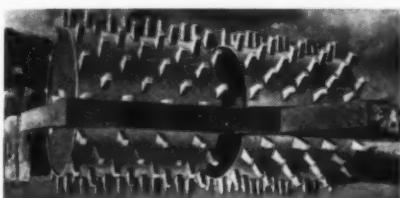
**PENNSYLVANIA REFINING CO.**  
2694 Lisbon Road Cleveland 4, Ohio  
Butler, Pa. Edgewater, N. J.

same handling ease that is possible with 2-wheel trailers of smaller capacity, according to the manufacturer. The new unit is 153 in. long, 72 in. wide and 66 in. high. Weight is 4300 lb.

26

## New Tamping Roller

A new Gebhard Model 120 tamping roller now in production by Shovel Supply Co., Dallas, Tex., has special wedge shaped feet, hard surfaced for



Gebhard Model 120 Tamping Roller

longer life. Each foot has a bearing pressure of 590 lb. per sq. in. of foot area. Empty, the drum has a bearing pressure of 320 lb. per sq. in. The roller comes in one or two drum units. The double unit is attached to a central draw shaft with heavy steel hinges.

## MANUFACTURERS' LITERATURE

27

## Standby Electric Plants

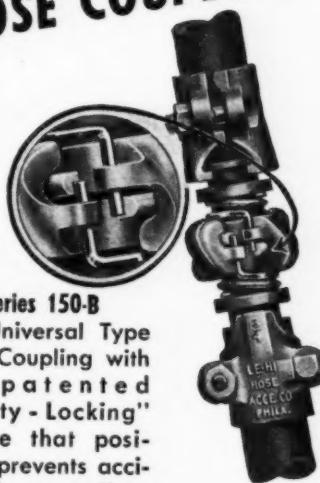
A broadside issued by D. W. Onan & Sons, Inc., Minneapolis, Minn., describes how standby electric power provides protection from electric powerline breakdowns by the installation of Onan emergency electric plants. A table of capacities of Onan emergency plants is included along with a description of the Onan automatic A.C. line transfer controls which are designed to switch over the electrical load to the standby unit within seconds after mainline power fails.

28

## Soil Stabilization

A bird's-eye view of mixing for bituminous construction and all soil stabilization processes as well as operating techniques in other applications for the Seaman mixer is given in a new 23-page catalog of Seaman Motors, Inc., Milwaukee, Wis. More than 40 action photographs show many unusual and interesting operations and

# LE-HI HOSE COUPLINGS



### LE-HI Series 150-B

The Universal Type Hose Coupling with the patented "Safety - Locking" feature that positively prevents accidental uncoupling. Especially designed for compressed air service.

## CAN TAKE IT!

### LE-HI Series 400

The ideal "all-purpose" coupling for heavy-duty, high-pressure service. For air, water, steam, etc. Extra heavy construction for maximum safety, efficiency and service life.

### LE-HI Series 300

A tough, sturdy coupling designed especially for use with jack hammers, tampers, rock drills, sinkers, etc. Corrugated-shank stem has collar to engage front lug of high-pressure clamp for extra protection against leakage or "blow-offs."



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Can be mounted on any short wheel-base truck having at least 8 ft. in back of cab. You can purchase unit separately and mount on your own chassis . . . The Netco Unit can be removed from truck in 30 minutes, permitting use of truck for other purposes. The Netco Bucket closes pneumatically assuring positive and maxi-

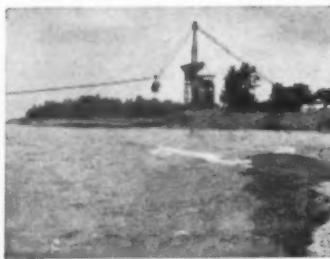
mum digging efficiency . . . The Bucket has full 1½ cu. ft. capacity with no chains or linkage to obstruct operation. The Netco Catch Basin Cleaner is faster, safer and more economical to operate than any other method used to remove debris from catch basins.

*Send for illustrated folder.*

**NETCO DIVISION CLARK-WILCOX COMPANY**

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## Save Power and Labor On Your Long Haul Digging



This Sauerman Slackline Cableway digs gravel from lake and keeps screening plant supplied with 75 tons an hour.



Sauerman Scraper moves material from wide pit to crusher.

## SAUERMAN CABLEWAYS and SCRAPERS

Your next material handling job will move faster and smoother, and pay off in real savings if you use SAUERMAN Cableways and Scrapers. A SAUERMAN Machine will range rapidly over a wide area, digging, hauling and dumping automatically in one economical operation. Requires only one man at the controls and power consumption is remarkably small, whether electric, gasoline or Diesel. Installation cost is low and maintenance simple.

Let us recommend the right type of machine for your class of work. Send for our illustrated Catalog and tell us about your own problems.

**SAUERMAN BROS., Inc.**

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the text offers quickly understood, time-saving explanations. Among the subjects described other than road-mixing, are brush and root removal in land clearing work, methods of obtaining higher densities in earth fills, preparation of grass seed beds and mulching for shoulders, back slopes and landscaped areas, as well as the use of the Seaman mixer in clearing ice from streets and highways.

## 29

### Conveyors

A new folio issued by Pioneer Engineering Works, Minneapolis, Minn., describes a new easy-to-order-plan for buying pre-engineered super service conveyors. The folio contains complete information to enable a purchaser to figure his own requirements. This easy-to-order-plan enables the customer to buy a complete conveyor by specifying only the barest of essential information. It enables the customer to secure a pre-engineered, factory-built conveyor designed in accordance with accepted engineering standards—without the necessity of designing and detailing each one. The conveyor furnished is a standard Pioneer super-service conveyor.

## 30

### 3-5 Ton Tandem Roller

An 8-page catalog on the new Galion 3-5 ton tandem roller is now available from the Galion Iron Works & Mfg. Co., Galion, O. With its variable weight, high maneuverability, ample power, and compaction effectiveness, it is said to fulfill all specification requirements for compressions ranging from 109 lb. up to 171 lb. per inch of roll width. In addition to detailed construction views and data, complete specifications are given in the catalog.

## 31

### New I. H. Tractor

A colorful, pictorial book on the new TD-24 crawler tractor is now available from International Harvester Co., Chicago, Ill. Designated by the company as Form No. A-34-LL, the book has a 4-color cover featuring both the TD-24 and "Planet Power Steering," the latter being a new design development in the crawler tractor field. The book uses the "picture story" techniques employed in modern magazine layout. Over 50 sectional views, line drawings and photographs—many in two colors—give a clear portrayal of the working functions of all important parts in the TD-24. Action photographs of on-the-job scenes are printed in duotone.

## 32

### "Hydropel" For Concrete Admix

Useful information on the employment and benefits of "Hydropel," an integral water-proofing admix for concrete, is given in a booklet issued by American Bitumuls Company, 200 Bush St., San Francisco 4, Calif. Hydropel, a slightly viscous liquid, is an aqueous suspension of colloidal asphalt developed for use in cement concrete and mortars. It is said to reduce water absorption, hence reducing expansion and contraction of the hardened mix. This product is advocated for structure that must be highly resistant to salt action, sea water, etc., and also for concrete pavements as well as concrete building blocks, mortar, industrial floors and other uses.

## 33

### Cone Crushers

Symons intermediate cone crushers for rock and gravel reduction are illustrated and described in a bulletin published by Nordberg Mfg Co., Milwaukee, Wis. The bulletin gives specification data and operating information. One page is devoted to the recently introduced Packaged Unit Crusher.

## 34

### Spreader

The new Miller bituminous concrete and aggregate spreader is illustrated and described in a circular by the Miller Spreader Corporation, Youngstown, O. The spreader can be used with any conventional dump truck that has been fitted with a hitch (bolt-on or weld-on) on the rear axle housing. An outstanding feature claimed for the spreader is that, regardless of the contour of the base surface, the screed moves forward on an even plane, leaving a smooth level surface ready for rolling.

## 35

### Arc Metal-Cutting Tool

Applications of the novel low-cost surface and underwater metal-cutting tool that employs electric arc vapor, known as "CutTrode" are shown in a new illustrated 8-page bulletin published by Eutectic Welding Alloys Corporation New York, N. Y. Complete information, technical diagrams, instructions for using "CutTrode" for large industries and smaller shops are given in detail. Operating hints outlined will aid all metal working men, whether for repair or production metal-cutting.

# 5 BASIC TYPES of ROGERS TRAILERS

• Choose the one that most nearly meets your needs and ideas. We'll develop a trailer "tailored" to conform to your ideas, adapted particularly to your tractor and efficiently designed to your specific kind of hauling.

**ROGERS BROTHERS CORPORATION**  
DESIGNERS and BUILDERS of HEAVY DUTY TRAILERS  
SINCE 1915

**FOR DEPENDABILITY specify KINNEY BITUMINOUS DISTRIBUTORS**

**5 GOOD REASONS**

**Why KINNEY Distributors work better, faster:**

- 1 Trouble-free Kinney rotating plunger pump, capacity 405 GPM . . . has no valves, springs, or gaskets. Applies all grades of bitumen rapidly and in exact amount specified.
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- 3 Two-burner heating unit placed low in tank heats bitumen safely and uniformly.
- 4 Kinney nozzles excel in uniform application — spray tar, asphalt, cut-back and emulsions without adjustment.
- 5 Simple, leakless Kinney three-way valve controls entire operation from circulating to loading or spraying.

Write for Bulletins

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New York • Chicago • Philadelphia • Los Angeles • San Francisco  
We also manufacture Vacuum Pumps, Liquid Pumps and Clutches

36

### Scraper Operation

A booklet "Caterpillar Scrapers at Work" published recently by Caterpillar Tractor Co., Peoria, Ill., pictorially and editorially described the loading, hauling and spreading jobs done by the "Caterpillar" No. 60, 70 and 80 scrapers packages with the "Caterpillar" Diesel D6, D7 and D8 track-type tractors.

37

### Wire Rope

A new 56-page booklet "Life Line" issued by Macwhyte Co., Kenosha, Wis., shows the various processes of manufacturing wire rope from wire rods through wire and rope mills. The story is presented in pictures with short captions in a similar manner to a strip film.

38

### Rubber Products

The Sixth Edition of "Manhattan Rubber Products for Industry," a condensed catalog of mechanical rubber goods, has been completed by the Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J. De-

scribed in this catalog are many mechanical rubber products and special items manufactured by Manhattan Rubber. Particular emphasis is given transmission and conveyor belting, V-belts, hose, engineered molded products, rubber roll coverings, tank linings, and abrasive wheels.

39

### Automatic Concrete Batching

A bulletin on the automatic concrete batching equipment now in use on the U.S. Corps of Engineers, Allatoona Dam project near Cartersville, Ga., has been issued by Scientific Concrete Service Corporation, Washington, D.C. A detailed description of the batching equipment and its performance is given.

40

### Portable Compressors

The complete line of Schramm portable engine driven compressors is described in a bulletin issued by Schramm, Inc., West Chester, Pa. These compressors are built in sizes ranging from 105 to 420 cu. ft. of actual air and include both gasoline and diesel engine driven units featur-

ing the In-Line construction which brings all the points of production and maintenance to the outside within easy reach of the operator.

41

### New Lightweight Pumps

A bulletin issued by Gorman-Rupp Co., Mansfield, O., pictures and describes the characteristics, performance and uses of the new Gorman-Rupp lightweight centrifugal self-priming pumps. Pictures of the three new lightweight pumps, the Midget 1 1/2 in., the Hawk 2 in. and the Eagle 3 in. together with their descriptions, performance data and a performance graph, are included. Lists and illustrations of some of the many uses for the lightweight pumps are given.

42

### Wood Preservative Paint

A booklet on Woodtrem, a new wood preservative paint, has been issued by Speco, Inc., Cleveland, O. Woodtrem is reputed to prevent rot and decay and to be especially adapted for wood that is to be buried in the ground or laid on an earth surface. Because of its creosote content, it is poisonous to bacteria and repels insects.

ESTABLISHED 1838

**Cunningham**

MOWER and SNOW PLOW

You cut weeds and grass as fast as five men with scythes . . . you clear snow as fast as seven men with shovels . . . all with this one economical machine.

Free wheeling convenient controls for easy handling . . . big 4:00 x 12 tires give positive traction. 3-foot sickle bar for mowing. 40-inch snow plow blade . . . quick and easy to attach . . . can be angled instantly right or left. Blade also ideal for light bulldozing. Spray rig and lawn mower attachments also available. LOOK AT THE NEW CUNNINGHAM REEL TYPE POWER DRIVEN LAWN MOWER.

Write Dept. RS for FREE literature.

**JAMES CUNNINGHAM, SON & CO.**  
GARDEN TRACTORS, MOWERS  
Rochester 8, New York



### Simple Design • Economical Operation • Sturdy Performance

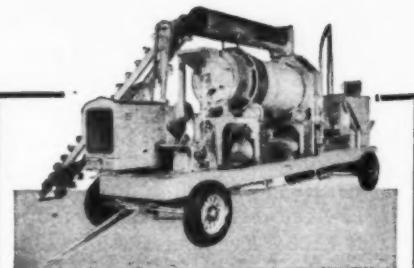
- ✓ One-man operation!
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- ✓ Only six wearing points!
- ✓ Loads 3 yds. in 3 minutes!

Built on a brand new principle! Its performance already has been proved by municipalities and individual owners. An S-C Truck Loader will pay for itself quickly. Send for literature and prices.

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## PORTRABLE ASPHALT PLANTS

Complete units for pavement maintenance. Capacities—4, 8, 12, 25 tons per hour.

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#### CONCRETE VIBRATORS

*Gasoline Engine and  
Electric Motor Driven Models*

#### HEATING KETTLES for Asphalt and Tar

#### AGGREGATE DRYERS for Stone and Sand

Write for Circulars

**White Mfg. Co.**

ELKHART

INDIANA



**Shunk**  
MANUFACTURING  
COMPANY  
ESTABLISHED 1854  
BUCKRUS, OHIO.

When writing advertisers please mention ROADS AND STREETS, April, 1948

43

## Tournahauler

The new heavy-duty, self-powered, hauling unit, the Tournahauler, is described in a 6-page illustrated folder, published by R. G. Le Tourneau, Inc., Longview, Tex. The Tournahauler, mounted on large rubber tires, is stated to have the power and traction to negotiate almost any type of rough going, and, with loaded capacities ranging from 20 to 100 tons.

44

## Screens

A new 4-page booklet, Bulletin No. 122-A, describing the Style M Vibrex screen, has been issued by Robins Conveyors Division, Hewitt-Robins Inc., Passaic, N. J. Briefed for quick reading is an explanation of the 2-bearing circle-throw principle employed in this screen, which has adjustable stroke and easy angle-adjustment.

45

## Airport Drainage

"Airport Drainage for Safety and Economy" is the title of a new 72-page manual recently published by Armclo Drainage & Metal Products, Inc., Middletown, O. The booklet is divided into five major sections covering (1) factors influencing design, (2) design of drainage systems, (3) airport loading, (4) selecting the drain pipe and (5) how to install the pipe. Tables, charts and photographs help to simplify the written discussion. The manual is available to airport managers, consulting engineers and architects, and others engaged in planning, building or improving airports.

YOU'LL BUILD  
*Better Roads Faster*  
AND BE  
*Money Ahead*  
WITH THE  
**SISALKRAFT**  
**METHOD**  
**OF CURING AND**  
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The SISALKRAFT Method gives you time and labor-saving advantages that cut your curing costs in half! Years of experience and research have developed improved application techniques. SISALKRAFT now is ready with new efficiency and new low costs for your paving season this year!



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**THE SISALKRAFT CO.**  
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mechanical handling or washing job, or modernizing an existing installation.

## 47

### Alloy and Weldability Directory

Condensation of a U. S. and Canadian engineering survey designed to show weldability of several thousand major and minor commercial alloys, as revealed by type of weld, equipment design, and practical application of special gas and arc welding rods, has been accomplished in an 8-page 3-color technical directory recently made available for 1948 by Eutectic Welding Alloys Corporation, New York, N. Y.

## 48

### Wire Rope Handbook

Every user of wire rope will find the new 119 page handbook published by the Wire Rope Institute, Washington, D. C. of interest and value. The purpose of the book is to provide information useful in selecting, buying and using wire rope. In addition data are given on fittings, attachments, splicing and other related subjects. Some of the sections included in the book are as follows: Standard Wire

Rope Specications, Selecting Wire Rope, Wire Rope Construction, Preformed Wire Rope, Strength and Weight Tables, Approximate Metallic Area, Approximate Moduli of Elasticity, Stresses in Guys for Derricks and Stacks, Drum and Reel Capacities, How to Specify Assemblies, Wire Rope Splicing, Wire Rope Socketting, etc. etc. The handbook was prepared by the Institute's Technical Committee and is for general distribution.

trays.

### Personnel

The design of all facilities at the Sampson Naval Training Station was under the direction of Shreve, Lamb & Harmon, Gilmore D. Clarke, Michael Rapuano and Malcolm Pirnie, Associated Architects and Engineers. The work was under the direction of Captain John C. Gebhard, USN, (CEC), officer in charge of construction. All features of the sod program planning and all recommendations for the preparation of the drill fields and the sod production and placing were developed for the Architect-Engineers by John R. Van Kleek. The actual performance of the work was under the direction of C. W. Sawtell, who acted as liaison between the design and the construction departments. The construction contract was held by J. A. Johnson Construction Co. and the Mount Vernon Contracting Corp., for whom the writer was Site Project Manager in direct charge of organizing the performance of the work and procuring the necessary labor, equipment and materials. The sod farm operations were directed by P. M. White and the drill field preparation and sod laying were directed by Richard Halton, both on the writer's staff of superintendents.

### Sod—Its Production and Placement at Sampson, N.Y. Naval Training Station

(Continued from page 98)

the sod farm. Covering of the first drill field was started Aug. 29, and completed in one month. The second field was completed in 11 days, and another field was completed in 10 days—an average of over 66,000 sq. ft. per day. Work was carried on at several fields simultaneously, depending on sod production and completed processed areas. The total labor used in sod laying was about one man-hour per 50 sq. ft. of completely laid, top-dressed and watered sod. This labor also includes the unloading of the trucks and the reloading of the empty

## FOOTE Kinetic MIXER

for all ASPHALT MAINTENANCE JOBS



Here's a mixer for all types of asphalt patching jobs... driveways, parking lots, sidewalks, buildings: Wherever there is an asphalt patching problem. Take it anywhere; tow it behind a car or truck. It is easy to handle and will mix either hot or cold material. It will produce 3 cu. ft. in 30 seconds. The new Kinetic mixing principle assures a thorough coating of aggregates. For details, send for Bulletin K-100. Also see page 41.

**THE FOOTE COMPANY, INC.**

1936 State Street • Nunda, New York

I nternational Competition for  
a new traffic route  
bridge or tunnel ("Osterleden")  
in Stockholm

The city of Stockholm invites experts of all countries to take part in a competition in connection with a new main traffic route (bridge or tunnel with approaches) in Stockholm between Södermalm and Östermalm—Norra Djurgården.

The sum of 60,000 Swedish crowns will be distributed unconditionally in prizes. The first prize will probably be 20,000 Sw. crowns. Entries must be received by latest 1st April 1949.

Full conditions etc. can be obtained from the "Competition Secretary, Stockholms stads stadsplanekontor, Stadshuset, Stockholm". A deposit of 100 Sw. crowns is required. Application may also be made to any Swedish Embassy, Legation or career consul, and the deposit paid in the currency of the country concerned.

An abridged form of the conditions etc. may be obtained free of charge from the Competition Secretary.

# OWEN BUCKETS carry Dunking Insurance

## Sealed Grit-Proof Bearings

Day in and day out, on the job in sand and gravel pits and hard at work dredging, Owen Buckets carry "dunking" insurance in the form of sealed, grit proof center shaft bearings.

Abrasive materials are prevented from causing excessive wear and longer bucket life is assured.

### The Owen Bucket Company

6070 Breakwater Avenue, Cleveland, Ohio

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RIGHT  
HERE

A MOUTHFUL AT EVERY BITE



## WITH THE MANUFACTURERS & DISTRIBUTORS

### Heads Trailer Makers

Harrison Rogers, vice president and general manager of Rogers Brothers Corp., Albion, Pa., is the new president of the Truck-Trailer Manufacturers Association. Mr. Rogers, 34, was chosen at



H. Rogers

the seventh annual TTMA convention to succeed Julius L. Glick, president of Truck Engineering Corp., Cleveland, as the head of the \$200,000,000 trailer-building industry. Mr. Glick had served two terms as president. His successor has been engaged in the "white collar" side of the trailer business since 1933, prior to which he worked in the shops of the Rogers company which specializes in manu-

facture of heavy-duty low-bed trailers. Elections also were marked by the choice of J. C. Farrell, Easton Car & Construction Co., Easton, Pa., to be "eastern" vice president of TTMA in place of N. A. Carter, Jr., Fruehauf-Carter Co., Memphis. John C. Bennett, Utility Trailer Manufacturing Co., Los Angeles, was elected to serve again as "western" vice president of the association, and W. E. Grace, Hobbs Manufacturing Co., Fort Worth, Tex., was reelected as treasurer.

### Relocates Eastern Offices

The Jaeger Machine Co., Columbus, O., has relocated its eastern regional offices. Formerly at 8 East 48th St., New York, the offices are now established at 1504 Widener Bldg., Philadelphia. L. T. Phillips, regional manager at the new Philadelphia offices, stated that this change of location has been made in order to more efficiently serve the 30 Jaeger distributors in the Maine-to-South Carolina territory. He also said that it places the regional offices more nearly equidistant from those of the company's district representatives G. S. Cox, in Boston, and R. R. Beck, in Richmond, and does not affect regional boundaries or distributors' territories in any way.

### John S. Boyd Is Dead

John S. Boyd, Vice President and Director of The Galion Iron Works & Mfg. Co., died recently at his home in Galion, O. The widely-known industrialist and philanthropist

John S. Boyd



was born in 1889 in Clarks Mills, Pa. He came to Galion in 1907 with his family when his late father founded the road machinery plant there. In 1911 he married Gladys Dice of Galion. Mr. Boyd graduated from Winona School of Technology, Indianapolis, Ind. He was a member of the First Methodist Church, the Elks Lodge, and was a 32nd Degree Mason. He was a director of the First National Bank at Galion, O. Two brothers are with the Galion Iron Works & Mfg. Co. in Galion—Ralph E. Boyd, President, and C. Findley Boyd, Vice President in Charge of Sales. Friends and business acquaintances will remember Jack Boyd for his fine personality and congenial friendliness, whether at business or recreation.

## save time between jobs with JAHN TILT TRAILERS



Tilt—load—and you're off in a matter of minutes with a Jahn Tilt Trailer. No jacks or loading ramps required. One-man operation. Positive, automatic safety lock holds platform in position when loaded or empty. Rubber mounted drawbar absorbs road shocks and protects both truck and trailer. Ideal for transporting tractors—rollers—compressors—shovel-loaders—mixers, etc. Jahn Tilt Trailers are available in 8 ton capacity tandem axle and 5 ton capacity single axle models. Write for specifications and illustrated bulletin or see your nearest Jahn distributor.

**C. R. JAHN COMPANY**  
Dept. 1345—1106 W. 35th Street, Chicago 9, Illinois  
Heavy duty trailers from 5 to 100 tons



## Advertising Agency Honored

In recognition of the contribution to sales made by its advertising, Northwest Engineering Co., Chicago, Ill., recently presented its agency, Russell T. Gray, Inc., Chicago, Ill., with a bronze plaque normally presented only to dealer organizations "in appreciation of 25 years devoted to the sale of Northwest shovels,



W. J. Higgins, Vice President and Art Director; Ruth Barr, Secretary-Treasurer; and Harvey A. Scribner, President, of Russell T. Gray, Inc., view with pardonable pride the plaque presented to the agency by its client.

cranes, draglines, pullshovels." In presenting the plaque to Harvey A. Scribner, President of the agency, C. R. Dodge, Vice President & Gen-

eral Sales Manager of Northwest, said "... our advertising has contributed as much to the success and sales of our company as has any other single factor."

## Le Roi Establishes New Sales Office

Le Roi Co., Milwaukee, Wis., has established a central district sales office at 6619 West Mitchell St., Milwaukee, adjacent to the main Le Roi plant. Norman M. Sedgwick has been appointed manager of the new district which embraces Ohio, Michigan, Indiana, Illinois, Wisconsin, Iowa, Nebraska, North and South Dakota, Minnesota, Ontario and Manitoba. Mr. Sedgwick, who started working at Le Roi Co., as an apprentice in July, 1928, has had experience in practically every department of the company. As manager of the Compressor sales division, he was closely associated with the company's activity in establishing and expanding its



N. M. Sedgwick

distributor organization into its present status involving over 150 outlets throughout the United States, Canada and overseas. The staff of the district sales office consists of six experienced sales engineers, located in Cleveland, Chicago, Ironwood (Mich.), and Milwaukee. Allen J. Bartlett is the senior member of the sales staff having served previously as industrial engine sales manager.

## New Marion Representative

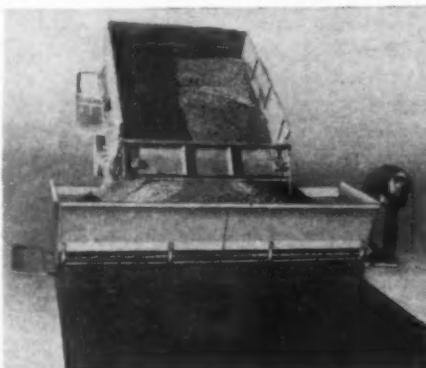
R. W. "Bob" Head has been appointed district sales manager of Marion Power Shovel Co., Marion, O., with headquarters at 4534 Travis St., Dallas 5, Tex. His territory will include Texas, New Mexico, Oklahoma and part of Arkansas. Mr. Head brings to his new position a wide acquaintance among Texas contractors from previous sales work in the excavating industry and a broad experience in construction



R. W. Head

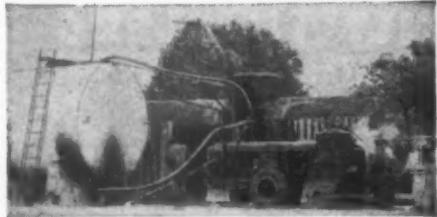
## The Grace SPREADER

A heavy duty Spreader for uniform application of sand, stone chips or rock to roads. Accurate and positive gate control. . . . Modern transmission. . . . Six 6.00-9 tires which are easily changed.



DEPENDABLE, EFFICIENT, PROFITABLE OPERATION

### HOT ASPHALT . . . QUICK!

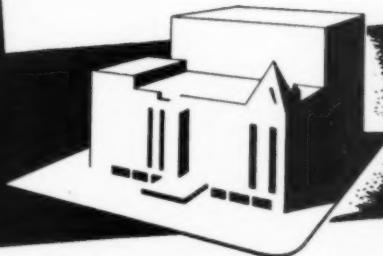


For information write or wire . . .

**W. E. GRACE MFG. CO.**  
6005 South Lamar Street • Dallas, Texas

Thaws one car while loading out another. Combination Steam and Circulator heater mounted on one chassis for fast, efficient operation. Designed for pumping heavy asphalt under ALL conditions.

## 1000 ROOMS IN **CLEVELAND**



**HOTEL  
HOLLENDEN**

ROBERT P. JOYCE, GENERAL MANAGER

# COMPARE THE COST-BUY LACROSSE

When you look forward to a busy season of *contracting, hauling, or equipment moving . . . Look To La Crosse For Transportation.*

Dealers In 48 States



work. He succeeds I. D. "Doc" Lumby who represented Marion in the Texas district for 10 years and who now is planning to devote full time to his interests in The Martin Machinery Co. of Dallas, a distributor for Marion. Mr. Lumby has been in the Marion organization for 25 years.

## Lowther Co. Moves

The Harry A. Lowther Co. Inc., manufacturer of the Lowther C-saw and other specialized farm and logging power tools, has moved into a recently acquired plant on Industry Avenue, in Joliet, Ill. The company administration and warehouse formerly located in Chicago, and the manufacturing operations previously carried on in Winona, Minn., are now located in Joliet.

## Aeroil Promotions

M. M. Yarrington, heretofore sales and advertising director, has been named general manager, and Fred C. Wittig, plant manager since 1936, assistant general manager of the Aeroil Products Co., West New York, N. Y. Both veteran company officials, Messrs. Yarrington and Wittig will head the expanding 31-year-old company as it prepares to move into new \$500,000 quarters in South Hackensack, N. J., about June 1.

## Berry Moves Main Office

Berry Asphalt Co. has removed its main office from 120 So. La Salle St., Chicago, Ill., to Magnolia, Ark. R. W. Francis and Jim Van Pelt will continue to represent the company on lubricating oil sales from their office at 120 So. La Salle St.

## Appointed Manager

R. F. Teeling of Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J., has been appointed manager of the local sales branch formerly known as "New Jersey Sales," and which will now function as "North Jersey Branch," to better signify the area of activity of this unit. Mr. Teeling was assistant manager under Grannell E. Knox, who was manager of the New Jersey Sales Branch for 34 years until his death in January. Mr. Teeling has been with the company for 36 years.

## FOR SALE

**Complete Asphalt Plant having capacity of approximately 60-70 tons per hour.**

### CONSISTING OF:

- 1—Barber Greene Dryer
- 1—Barber Greene Continuous Mixer
- 1—Barber Greene Dust Collector
- 1—Barber Greene Aggregate Control Bin  
(Above powered by G.M. Diesel and was purchased new August 1947 mixed 12,000 tons.)
- 2—10,000 Gal. Asphalt Storage Tanks on Semi-Trailer
- 1—75 H.P. Automatic Boiler on Semi-Trailer
- 1—Asphalt Transfer Pump—Int. Motor
- 1—Barber Greene Finisher
- 2—Buffalo Springfield Tandem Rollers
- 1—Power Sweeper Broom
- 1—4,000 Gal. Fuel Oil Tank on Semi-Trailer
- 1—Portable Platform Scale

The above being a complete plant and will be sold only on that basis F.O.B. our yard, Lancaster, Pa.

**Price: \$70,000**

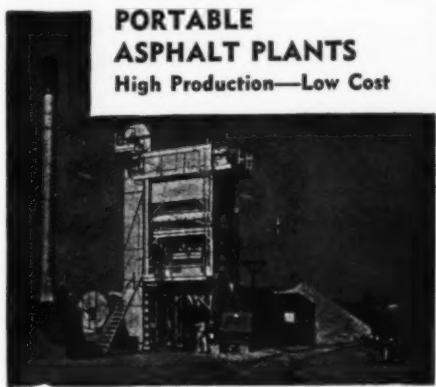
## McMinn's Industries Inc.

Phone: Lancaster 7265. Box 509  
Lancaster, Pa.

The above is our net price whether sold to dealer or contractor, subject to prior sale or withdrawal.

## PORTABLE ASPHALT PLANTS

High Production—Low Cost



THE McCARTER IRON WORKS, INC.  
NORRISTOWN,  
PENNA.

## VULCAN PAVEMENT AND CLAY DIGGING TOOLS

ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

Send for NEW Vulcan Illustrated CATALOG today.

**VULCAN** TOOLS—THE WORLD OVER  
NOTED FOR QUALITY AND DURABILITY

VULCAN TOOL MFG. CO.  
QUINCY, MASS.

# CLEARING HOUSE

## FOR SALE

One new unused Etnyre Road Oil Distributor Complete. No truck under it.

Price \$5250.00

CHARLES B. SNYDER  
Box 1952 Great Falls, Montana

## FOR SALE

Adams 511 Grader, Diesel, in good condition. Closed Cab, Self-starter, electric lights, scarifier, 12' blade. Includes Adams V type snow plow. Rex 10-S, 2 bag concrete mixer in good condition with batch meter and water reservoir. 2 wheel, pneumatic mounted. 850 gallon Brokel Bituminous pressure distributor with Viking pump, mounted on a 1938 D-40 International. W. R. Croasdale, Box 67, Pottstown, Pa.

## DEPENDABLE USED MACHINES

TD-9 with angledozer  
Osgood  $\frac{1}{2}$  yd. dragline  
Int. I-4 with Hough shovel  
Pioneer 16V gravel plant  
Osgood  $\frac{1}{2}$  yd. backhoe  
Browning 10 ton truck crane  
TRACTOR & EQUIPMENT CO.  
3521 W. 51st St. Chicago 32, Illinois

## EQUIPMENT FOR SALE

- 1—Rex 34-E dual drum paver Serial No. GG153.
- 1—Blaw-Knox concrete finishing machine. Serial No. XB-2087.
- 1—Jaeger concrete finishing machine. Serial No. 42-X-087.
- 1—Buckeye power driven fine grader. Serial No. 319.
- 1—International TD-14 tractor. Serial No. TDF-675.
- 1—Trail grader—Cleveland. Serial No. 4176.

All of the above in excellent condition.

IVY R. SMITH COMPANY  
Jacksonville, Fla.  
P.O. Box 5098. Ph. 9-4458.

## FOR SALE

- 1—Northwest 1 $\frac{1}{2}$  cu. yd. Combination Dragline and Shovel, Model 104, completely overhauled.
  - 1—Inslay  $\frac{1}{2}$  cu. yd. Combination Dragline and Shovel. Good condition.
  - 1—Link-Belt LS-50 half yd. Combination Dragline and Shovel. Good cond.
  - 1—Lima Model 101 yard and half Dragline only. International Diesel engine, in A-I condition.
  - 1—Lorain 40% cu. yd. Combination Dragline and Shovel. Fair condition.
  - 1—A.C.H.D.-10 late model Diesel Tractor with hydraulic straight bulldozer.
  - 1—A.C.H.D.-14 late model Diesel Tractor with hydraulic angle dozer. With heavy duty cargo winch on rear. 17' pull cable.
  - 1—Cleco Tractor, 61 H.P., Model D.D.H. with hyd. bulldozer.
  - 1—Luff  $\frac{1}{2}$  yd. Front-End-Loader, mounted on Oliver rubber tired tractor. Fine for truck loading.
  - 1—Teelsmith 9 x 16 Rock Crusher, complete, mounted on factory trailer with bucket elevator. Powered with 4 cyl. Leroy engine V-belt drive.
  - 1—Universal 10 x 36 Rock Crusher, Elevator. Mounted on 4 wheel factory built trailer, International Diesel engine.
  - 1—Electric Generator, 75 K.W., 220 volts, mounted on heavy base, powered with Caterpillar 13,000 diesel motor like new.
  - 2—International Crawler Type Tractors. 33 and 40 h.p. logging tractors.
- Also Scrapers, Power units, Motor Patrols, Air Compressors, Concrete mixers.

BUY NOW, conditions indicate shortage in both new and used machinery for some time to come

## BROWN & MALONE

Phone 2-1455, P. O. Box 305

**Heavy equipment dealers**  
**Little Rock, Arkansas**

## FOR SALE

SIX EUCLID TRACK-TRUCKS 15 cubic yard capacity, powered with 150 HP Cummins Diesel engines, Shop Numbers 37122-23-24-37-38 and 42148. All units recently reconditioned. Immediately available. Inspection invited. Located Gorham, Illinois. For further details call or write

STERNBURG DREDGING COMPANY  
1706 Arcade Building, St. Louis 1, Missouri  
Telephone Chestnut 9120.

Available for immediate delivery, rental or purchase, at very attractive price

Two Wooldridge Terra-Cobra self-powered Scraper units, 15 yards struck, 18 yards heaped; Cummins Diesel Engines with less than 200 hours on either machine.

Box 118, Care of Roads & Streets  
22 West Maple St., Chicago, Ill.

## STEEL STORAGE TANKS

- 6—6000 & 10,000 GAL. R.R. CAR
- 2—15,000 GAL. WITH COILS
- 12—NEW 42,000 GAL. CAP.

L. M. STANHOPE, Rosemont, Penna.

## FOR SALE

New 100 H.P.

## FORD MERCURY POWER UNITS

Complete with self starter, generator, distributor, governor, oil-bath air cleaner, battery, special large cast iron shell radiator, oversize 19-inch diameter fan, all enclosed in a sheet metal house.

Price each \$535.00

Twin Disc power take-off clutch.....each \$55.00  
These are new units on which we are overstocked.

GEHL BROS. MFG. CO.

DEPT. 68 WEST BEND, WIS.

## FOR SALE

Rex Model 27E Paver—Serial G940E \$2500.00  
McKiernan-Terry Pile Hammer—Serial 10361 with steel leads. New 1947 2500.00

50 KW Diesel Generating Set—International VD 18 6 cyl. 100 HP Diesel. New condition 4000.00

315 cu. ft. Schramm Diesel Powered Air Compressor—Serial 450719 3500.00

Buffalo Springfield Roller, 10-ton—Serial 15906 2500.00

1 yd. P & H Dragline with bucket—1927 Machine, as is 4500.00

Whitcomb Locomotive No. 11307—30 ton—as is, Standard Gauge 3500.00

MANITOU CONSTRUCTION CO.

Rochester 4, New York

## FOR SALE

IMMEDIATE SHIPMENT FROM STOCK  
FOB JACKSON, MISSISSIPPI

## NEW

100 H.P. Murphy Diesel Power Units  
160 H.P. Murphy Diesel Power Units  
60-105-160 Air Compressors  
5 to 8 Ton Tandem Roller  
8 to 10 Ton Tandem Rollers (Surplus)  
Austin-Western Badger Shovel  
D4 Caterpillar (Narrow Gauge) LeTourneau Dozer  
Hay Balers  
Model 900 (64 HP) Oliver Industrial Tractors  
FP (15 yd.) LeTourneau Scraper  
Model 840 Barber-Greene Asphalt Distributor (complete)  
Model 8-20 Bush & Bog Disc

## USED

- 3—DW10 with 8 Yd. LeTourneau Scrapers completely rebuilt
- 1—304 Koehring Dragline (Caterpillar motor) completely rebuilt
- 1— $\frac{1}{4}$  Koehring (New cab, Boom & General Motors Diesel Motor)
- 1—10K Inslay Dragline & Backhoe combination, rebuilt
- 1—12 yd. LeTourneau Scraper
- 1—HD10 AC Tractor & Dozer
- 1—HD7 AC Tractor & Dozer
- 1—50 Caterpillar Diesel Tractor
- 2—6" Wellpoint pumps (used one day)
- 1—Adams 51 Diesel Motor Grader
- 1—#10 Caterpillar (S.D.) Motor Grader
- 1—104 Adams Blade Grader
- 1—125 Adams Blade Grader
- 1—New Linkbelt Crane mounted on 6x6 6-ton Diamond T Truck

WATKINS-ALDRIDGE  
EQUIPMENT CO.

912-916 So. State Street, Jackson, Miss.

## SALES REP. WANTED

Established manufacturer of vehicles desires sales representative experienced in automotive or equipment field. Item is a revolutionary new type of trailer for transportation of equipment. It has received overnight acceptance since being placed on the market. Give full details of past experience and territory desired. Address

ARTHUR REHBERGER & SON  
320 Ferry St., Newark 5, N. J.

## TRANSITS and LEVELS

New or Rebuilt

Sale or Rent

Headquarters for REPAIRS—any make. Factory service. We will also buy your old instruments or take them in trade.

A complete line of engineering Instruments and Equipment for Field or Office. Write for Bulletin RS-24.

WARREN-KNIGHT CO.

Manufacturers of Sterling Transits and Levels  
136 N. 12th St. Philadelphia 7, Penna.

# YOU can't afford to miss the *Road Show!*



**No matter how busy you are . . . it will pay you to drop everything — July 16 to 24 — and ride, drive, or fly to the big 1948 Road Show in Chicago.**

Here — in one place, at one time — you'll have an opportunity to see and compare all the latest developments in roadbuilding equipment and methods. You'll also have a chance to pick up vital information on planning, organization and costs . . . facts you must have to keep pace with changing conditions in the construction industry. But remember, this is the first Road Show in 8 years . . . everybody's going to be there . . . so don't put it off! Make your plans and reservations NOW!

## QUICK FACTS

- A 9-day opportunity to "catch up" on all that's new in road-building.
  - 30 football fields of latest post-war equipment — displayed AND OPERATED out-of-doors.
  - Down-to-earth discussions by world-famous roadbuilding authorities.
  - A chance to meet old friends . . . make new contacts.

# **45<sup>th</sup> ANNUAL CONVENTION AND INTERNATIONAL ROAD SHOW . . . SOLDIER FIELD, CHICAGO, JULY 16-24, 1948**

# **AMERICAN ROAD BUILDERS ASSOCIATION**

International Building, Washington 4, D. C., U.S.A.

# Built to Cut Costs on Heavy Duty Air Tool Operations...

DIXON quality in Air Hammer Couplings assures definite savings on rock drilling and other heavy-duty air tool jobs... longer service life through superior strength and durability; greater efficiency through elimination of leaks and pressure losses; lower hose replacement costs through protection to hose ends.



## "G J-BOSS" AIR HAMMER COUPLING

Ground joint construction—no worn or mislaid washers to replace. Built for heavy duty and hard wear. Furnished with strong "Boss" Interlocking Clamp. Large wing nut facilitates connecting and disconnecting. Compact and heavy types. Cadmium plated—rustproof. For washer style, specify "Boss" Air Hammer Couplings.



## "DIXON" AIR HAMMER COUPLING

Washer style. Efficient, durable, inexpensive. Steel stem has deep, smoothly finished corrugations. Rugged malleable iron clamp has dual gripping ridges on inner surface. Compact and heavy types. Cadmium plated—rustproof. Also available in ground joint construction—specify "G J-Dixon" Air Hammer Couplings.

Stocked by Manufacturers and Jobbers of  
Mechanical Rubber Goods

IF IT'S A **DIXON** PRODUCT  
IT'S DEPENDABLE

**DIXON**  
VALVE & COUPLING CO.  
Main Office and Factory: PHILADELPHIA, PA.  
BRANCHES: CHICAGO, BIRMINGHAM, LOS ANGELES, HOUSTON

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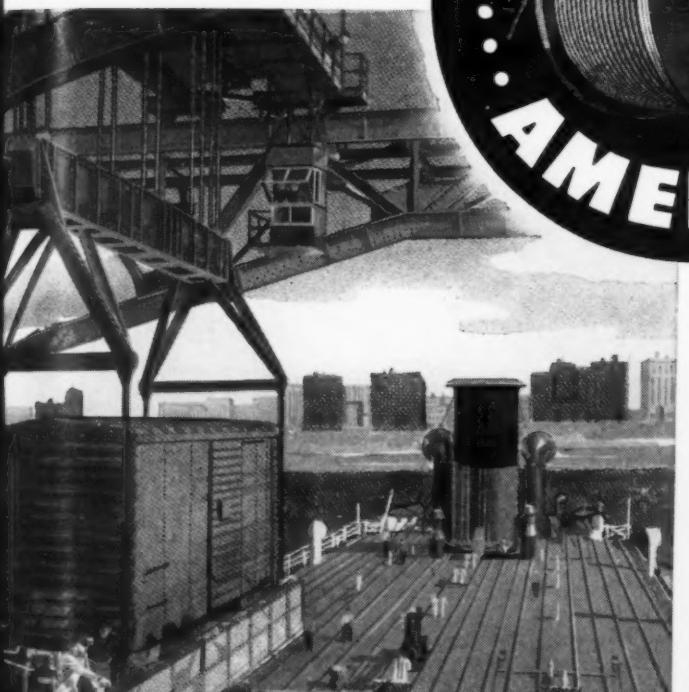
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In Galveston Bay, huge rotary drilling rigs bore nine thousand feet under the sea for oil. Long strings of pipe put tremendous shock loads on wire rope. TRU-LAY Preformed stands up extremely well even under such treatment.



Breaking up hard-packed earth is the first step in grading for water drainage in Nebraska. These earth-breaking machines put constant gruelling strains on the wire rope. Here again, TRU-LAY Preformed gives longer, lower cost service.



Hoisting a completely loaded box car onto a Sea-train for over-water journey from Edgewater, N. J., to Texas City. TRU-LAY Preformed is hard at work every day on thousands of huge overhead traveling cranes like these—giving good service.



Far down below ground in West Virginia's soft coal fields, under-cutting machines claw at the walls of coal. Here wire rope is expendable. TRU-LAY Preformed of correct construction adds many extra hours of service—lowers over-all costs.

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York,  
Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

AMERICAN CABLE DIVISION  
AMERICAN CHAIN & CABLE



In Business for Your Safety

Tru-Lay  
Preformed  
Wire Rope

# ASSURE GREATER OPERATING ECONOMY



## Keep engines clean by lubricating with Texaco Ursa Oil X\*\*

PUT Texaco Ursa Oil X\*\* in your heavy-duty engines — gasoline or Diesel — and reduce fuel consumption and the cost of repairs and maintenance.

Texaco Ursa Oil X\*\* is fully detergent, dispersive, and resistant to oxidation. It keeps engines clean . . . prevents deposits of sludge, varnish and carbon that steal power . . . assures free rings and valves . . . protects bearings from corrosion . . . reduces wear. For the best and thriftiest engine

operation, lubricate with *Texaco Ursa Oil X\*\**.

For chassis parts of trucks, tractors, graders and other equipment, lubricate with *Texaco Marfak* — the world-famous chassis lubricant that lasts longer on the job . . . seals out dirt and moisture. And give crawler track mechanisms full and lasting protection with *Texaco Track Roll Lubricant*.

To get the best performance . . . most economically . . . from all your equipment, follow the Texaco Simplified Lubrication Plan. For details, call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.



# TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN . . . TEXACO STAR THEATER every Wednesday night featuring Gordon MacRae, Alan Young, Evelyn Knight: ABC Network.